Michael Byrne.

Message

FROM

THE GOVERNOR,

ACCOMPANIED WITH

THE REPORT

OF THE

CANAL COMMISSIONERS.

Read in the Senate, December 15, 1828

HARRISBURG, PA.

S. C. STAMBAUGH, PRINTER.

1828.

GOVERNOR'S MESSAGE.

To the Senate and House of Representatives of the Commonwealth of Pennsylvania.

GENTLEMEN,

I have the honor of transmitting to you a copy of a letter from the president of the board of the canal commissioners, together with a copy of the report, with the documents accompanying the same, made in obedience to law.

J. ANDW. SHULZE.

Harrisburg, December 13, 1828.

REPORT, &c.

OFFICE OF THE CANAL COMMISSIONERS,
Harrisburg, December 11, 1828.

SIR,

By direction of the canal commissioners, I have the honor herewith to enclose their annual report.

Very respectfully
Your most obedient servant,
DANIEL MONTGOMERY.

His excellency Governor SHULZE.

The canal commissioners of Pennsylvania, respectfully submit the following

REPORT:

By their annual report on the 25th December, 1827, it appeared, that the amount of canal then under contract and in progress towards completion was about 212 miles, composed of the following divisions:

Western division from Pittsburg, up the Allegheny, Kiskeminetas and Conemaugh to Blairsville,	80 miles.
Part of French creek feeder, from Bemis' mill, to Conneaut outlet,	9 miles.
Eastern division from the mouth of Swatara, to that of Juniata,	24 miles.
Juniata division, from a point near the mouth of Juniata to Lewistown,	44½ do.
Susquehanna division, from a point near the mouth of Juniata to Northumberland,	37 do.
Delaware division, from Bristol to Taylor's ferry,	18 do.
	212½ miles.

This aggregate is increased by about 4½ miles, added to the Juniata and Susquehanna divisions in order to unite them at a convenient point on Duncan's island, making the whole amount contracted for, under the authority of the acts of 1826 and 1827, about 217 miles.

Since the report alluded to was made, the work on the several divisions has been steadily prosecuted. Considerable delay was produced by the prevalence of high water, from an early period last fall to the month of June last, and severe inconvenience has also been felt, from sickness on the Juniata, Susquehanna and Delaware. It will appear nevertheless from the following sketch of the state of these divisions, that a great amount of work has been accomplished.

The whole western division from the out-let locks on the Allegheny to Blairsville is so far completed, that it will unquestionably be navigable at the opening of the spring. From the salt works fifty miles above Pittsburg to the Kiskeminetas feeder, the line is in actual use, and water is now flowing through that feeder, to supply the whole distance below. From the salt works upwards to Blairsville, nothing remains which may not easily be finished during the present winter.

The nine miles of the French creek feeder, are in a similar state of forwardness. One or two culverts, four bridges, the fencing of the line and a very small quantity of excavation and inside wall, are the only matters requiring further attention.

The amount of work done on the Juniata, between Lewistown and the mouth of Juniata, may be regarded as equal to two-thirds of the whole. This line has suffered from sickness more severely than any other in the state, and it experienced moreover a great scarcity of hands, in the earlier parts of the season. Those difficulties being now entirely removed, its completion may be expected before the 1st of August.

The Susquehanna division, from the mouth of Juniata to Northumberland, is considered as three-fourths completed. Like the Juniata line, it was delayed by the scarcity of workmen in the early summer months, and by the sickness incident to our river valleys. At its present rate of progression, it cannot fail of completion by the first of July next.

The eastern division is entirely finished, except the two sections at Peter's mountain, (on which about two months work remains,) and the aqueduct embankment at Stony and Clark's creeks. It is confidently believed, that the navigation, from the mouth of Juniata to Middletown, will be in actual use, before the rising of the legislature.

The contracts existing on the Delaware, at the date of the last report, extended only to the excavation and canal formation of eighteen miles, and included no work of wood or stone. All these contractors have been satisfactorily completed, and further contracts have been made, for the locks, culverts, aqueducts and bridges on that portion of the line, to be executed early in the next season.

In executing the act of the last session of the legislature making further appropriations for the Pennsylvania canal and directing additional contracts to be made, the board acted on the principle that the money thus placed at their disposal should as far as practicable be devoted to the old lines, and that the new contracts should be made so late in the season, as to constitute no serious charge upon the existing appropriation.

At a meeting of the board in March, it was deemed advisable, to place under contract seven additional miles of the Delaware division, which was accordingly done on the 20th May following.

No arrangement having yet been made with the state of New-Jersey for the use of the Delaware, and it being still uncertain from what quarter the canal might ultimately be filled with water, the engineer was directed to re-examine the whole line from New-Hope to Easton, and so to adjust its location as to admit of a full and easy supply, whatever might be the result of a negociation with New Jersey.

This was satisfactorily effected to a point about seven miles below Easton, from which the location must entirely depend upon the question, whether the Delaware or the Lehigh be used as a feeder. The board accordingly determined at their meeting in August, to place under contract twenty eight and a half miles from New-Hope upwards, and to reserve the remaining distance until the result of the negociations pending with New-Jersey should be known. Of this amount 18 miles were contracted for on the 18th of September, and ten and a half miles more on the 18th of November. The excavation and canal formation of the first seven miles of the Delaware line, above Taylor's ferry are nearly completed. The next eighteen miles are actively advancing, and in the remaining ten and a half miles the contractors are now commencing their operations. The payments already made on the new line, amount to $28,285 33. It is the intention of the board to extend their contracts to Easton as early as possible next spring.

At the meeting of the board in March last, Charles T. Whippo, Esq was appointed an engineer and was directed to commence the location of a canal line upon the north branch of the Susquehanna. Having selected the Nanticoke falls, 54 miles above Northumberland, as the proper place for taking a feeder, he continued his line 27 miles downwards, and reported it to the board at their meeting in June. His plan being approved, that portion of the canal was placed under contract, on the 24th of July. At the meeting in August, the remaining distance of 27 miles to Northumberland was located by the board, and the superintendent was directed to enter into contracts for 18 miles, so as to make up the 45 miles authorised by law. The work on this division has advanced with great spirit, and should the legislature authorise the construction of the remaining nine miles, estimated to cost only 37,000 dollars, a perfect navigation of 54 miles on the North branch, laying open

the whole region of anthracite coal on that stream, will be in use by the spring of 1830.

In conformity with the act of the last session, Mr. Francis W. Rawle, an engineer in the service of the board, was instructed to make an accurate survey and estimate on both sides of the West branch from Northumberland to the mouth of Bald Eagle. His report of these surveys having been laid before the board, at their session in August, and it appearing to their satisfaction, that the left bank of the river was decidedly preferable, a portion of canal on that bank, commencing at Northumberland, and extending upwards to the Muncy Hills, 23 miles, was placed under contract on the first of October. Since that period the work has been commenced on every section, and within the present week payments will have been made to the amount of $20,000. As this line presents unusual facilities, no doubt is entertained of its completion within the coming year.

At an early period of the summer, Mr. Clinton, the engineer of the Juniata division, was instructed to continue that line from its termination at Lewistown a further distance of forty-five miles. In the preliminary examinations necessary for this purpose, a survey was made, as required by law to determine the practicability of carrying the canal along the Kishacoquillas valley. At the meeting in August, Mr. Clinton made report on this subject and presented to the board a draft and estimate of the line selected. He also reported that the proposed route along the Kishacoquillas valley was wholly impracticable. In the month of October last, contracts were entered into for forty-five miles, commencing at Lewistown and terminating at Smith's mills, a short distance above Huntingdon. On this portion of canal, operations have partially commenced, but no payments will be made until the 15th of January next, and its completion is not looked for before the middle of the year 1830.

Contracts have also been entered into for the extension of the French creek feeder 10½ miles, for continuing the Western division from Blairsville up the Conemaugh 27 miles, and for ten miles of the distance between Middletown and Columbia, all of which are commenced, but no payments have been made for work, except a small amount on the feeder line.

Early last spring major Wilson, as engineer of the Pennsylvania rail-way, was directed to commence at Columbia and to make an accurate location of the whole line from thence to Philadelphia.—He was instructed to examine every route which had been proposed to the board, or which might be deemed advantageous by the inhabitants of the country, through which the improvement passes. In such a survey much time was necessarily consumed, and consequently, no part of the line has yet been constructed. At the present session of the board a full and gratifying report has been received from major Wilson, shewing that a rail way graduated within the limit of locomotive machinery is perfectly practicable from the bank of the Susquehanna to that of the Schuylkill, and containing minute

estimates and descriptions of the work. At each end of the road an inclined plane and stationary engine will be required to reach the river level. From the inclined plane in the Schuylkill, which it is contemplated to fix near the residence of the late judge Peters, the rail way will cross that river by a bridge, and pursuing the line of the old Union canal, will reach the city of Philadelphia at the intersection of Broad and Vine streets. The board have reason to believe, that the selection of this line, has been skilful and judicious, and that the mode of entering the city of Philadelphia, is preferable to any other proposed. They have, therefore, confirmed the whole location and in compliance with law, have directed the road formation of 40 miles to be placed under contract.

It is believed, that a line of railway, leading to a large city, cannot exert its full capability, without the construction of branch lines near its point of termination, by means of which the trade may be conveniently diffused. It would be difficult for the board to fix the localities of such branch lines, as they must occupy in some degree the streets of the city, and otherwise interfere with its internal regulations. They have regarded it however, a great advantage attending the present location, that by keeping the level of the summit between the Schuylkill and the Delaware, it admits of an easy extension to the latter river through the city or adjoining districts, and it is recommended that every facility for such extensions be afforded either to the corporations of the city and districts, or to associations of individuals formed for the purpose.

While considering this subject, they have been struck with the importance in a commercial point of view, of a line from the stationary engine near Judge Peters', to some point on the Schuylkill, affording a complete communication with the ocean. As such a line must follow the west side of the river, the difficulty before suggested would not be felt but for want of authority under the existing law, the board would be prepared to direct its construction.

A particular and very extensive examination of the Allegheny mountain, with a view to a portage between the Juniata and Conemaugh canals, has been made this season by Mr. Nathan S. Roberts. A number of projected routes have received attention, and a vast amount of useful information is embodied in his report, the results however are not so conclusive as to justify a decision, until some additional investigations shall have been made.

Mr. Roberts having accepted employment elsewhere, Moncure Robinson, Esq. an engineer of high reputation, has been appointed in his place. He will be furnished with the notes and drafts of Mr. Roberts, and as early as possible will commence his enquiries, with a view to the construction of a railway, composed of lifts and levels, and also of a Mac-Adamized road, of easy graduation between the two canals. This latter examination is dictated from a belief, that such a turnpike will be found indispensable for the accommodation of travellers, having business on the canal and railway, and not from a wish to place it in competition, with the first.

named mode of improvement as a means of transportation for merchandize and produce.

The surveys authorised by law for a rail road line from "some point on the Lehigh and Schuylkill canal to Sunbury, Danville and Catawissa," and for canals and railways, between the north branch by Nescopeck valley, and other projected routes, have been ably executed by Mr. Robinson within the present season. For an account of operations so extended embracing the whole summit, between the waters of the Susquehanna and the Delaware, as far north as the Lackawana, and branching off into innumerable lateral examinations, recourse must be had to the report of Mr. Robinson annexed hereto. Among other results it is ascertained that a canal by way of Nescopeck valley is entirely practicable, although the amount of lockage will prove a serious inconvenience. It appears also that from Catawissa a railway suited to locomotive engines, except at the summit where stationary power must be employed, may be carried either through Quakake valley to the Lehigh, by the Schuylkill to Pottsville or the head of Little Schuylkill to its mouth, and that a railway conveniently adjusted for the use of horse power may be made from Pottsville to Sunbury or Danville. Particular drafts and estimates of several of these routes will be forwarded to the legislature, as soon as they can be prepared. Agreeably to the law of last session a further examination of the proposed line of canal from Easton along the Delaware to Carpenter's point, has been made by Major Douglass, and two estimates have been furnished, one for a canal of the same dimensions with that below Easton, and the other for a canal of reduced size as described in the law. The cost of the larger improvement is estimated at an average of $13,309 per mile, and of the smaller at $11,678. The last mentioned sum having fallen below the maximum fixed by the legislature, a resolution determining the location of the line has been passed by the board, but no part has been placed under contract.

At the meeting of the board in March last, Mr. Edward F. Gay, late engineer of the Conestoga navigation, was selected to execute the surveys with a view to canals and slackwater navigation directed to be made on the Allegheny, Monongahela and Ohio rivers. His instructions embraced the various modes of improvement mentioned in the act of the last session of the legislature, and a full report on each of these subjects referred to his care, is now presented. The cost of a navigation, by dams, locks and ponds, adapted to steam boats along the Allegheny river, from the mouth of French creek to that of Kiskeminetas, (the plan preferred by Mr. Gay,) is estimated at $923,098, or about $10,000 a mile for 93¼ miles. He represents the construction of a canal along the Monongahela as almost impracticable, but that river may be advantageously improved in many places by dams and locks, at an expense of $265,000. The cost of a steam boat navigation from Pittsburg down the Ohio to Beaver by dams and locks, is estimated at $221,298.

At a late period of the present season, Mr. William R. Hopkins, an engineer, recently in the service of the state of Ohio, was engaged to ascertain the practicability of a rail road from the west end of the Harrisburg bridge to Chambersburg, and from thence by way of Gettysburg to York. His labours in the field are now about completed, and his report, as soon as received, will be forwarded to the legislature.

In this sketch of operations within the past year, it has been the object of the board to avoid all unnecessary detail. For such further particulars as may be desired, reference is made to the numerous documents annexed hereto.

For the sake of brevity also, they have deemed it expedient, to present at a single view, a list of all the contracts which will claim attention within the coming year. As the eastern and western divisions are already so far completed, that they cannot be the scource of much additional expenditure, after the work already done shall have been paid for, they are left out of the account. The other lines, at a liberal estimate, will stand as follows:

Delaware,	520,000
North Branch,	330,000
West Branch,	151,000
Juniata, (lower line)	315,0 0
Do. (upper line)	890,000
Susquehanna division, including dam and bridge over the river,	280,000
French creek feeder,	76,000
From Middletown to Columbia,	245,000
Conemaugh, from Blairsville to Johnstown,	500,000
Part of the Pennsylvania rail road,	200,000
	$ 3,511,000

It is estimated from the experience of former seasons, that supposing the utmost activity to be used upon all the lines within the approaching year, at least $700,000 of the aggregate exhibited by this statement will remain to be expended in the year 1830, so that the amount required for the operations of next year, making full allowance for the sums yet to be paid on the eastern and western divisions cannot materially exceed $3,000,000, and may probably fall short of that sum. Inasmuch however as the faith of the commonwealth is already pledged for the contracts made, it will probably be desirable, that a precise limit should not be fixed, and that full scope should be given for the execution of such contracts, as early as possible.

That this statement presents a scene of operations of great extent, is readily admitted. But it is equally certain, that a vigorous effort for another year, will so reduce its magnitude, as to place the success of the whole system of internal improvement beyond a reasonable doubt. By the month of August next, 47 miles on the Juniata, 41 miles more on the Susquehanna, and 28 miles on the

Delaware will certainly be completed, reducing the whole distance to 154 miles. By the month of December next, the north and west branch divisions may be ready for navigation, the Delaware line to Easton will be nearly completed, and the obligations of the commonwealth for lines now under contract will have been reduced to a sum considerably short of one million of dollars.

Upon the view thus presented the board would propose a system of proceeding, recommended at once by its extreme simplicity, its tendency to sustain the confidence of the public, and the certainty it affords, that the whole scheme of internal improvement adopted by the states embracing a complete communication from Philadelphia to Pittsburg and Lake Erie, and the projected lines along the Susquehanna and its branches, and the Delaware, may be triumphantly executed within a reasonable period.

It is based upon the supposition, that the whole expenditure of the coming year will be $ 3,000,000 which added to $ 3,300,000 already borrowed make $ 6,300,000, and also that the income from the eastern and western divisions next year will equal the interest of the excess of the canal debt above $6 000,000 at the end of that year. Upon these suppositions it is proposed:

1. That the revenue at present applicable to the interest of canal loans be so increased by legislative provisions, as to produce annually the interest of six millions of dollars, independently of all receipts from the canals.

2. That all further extension of the line of improvements, beyond the cost of six millions of dollars shall be made by loans, upon the credit of receipts from the finished canal, and shall be limited by the sufficiency of those receipts to discharge the interest of such further loans.

3. That as the finished portions of the canal increase in revenue, so as to exceed the interest of the loans, to which they are pledged, the excess shall be applied as a sinking fund, or as a fund for the making of other valuable improvements, not included in the present system.

The board in offering these suggestions, desire it to be understood, that they mean not to diminish the extent of the system, as already adopted, but on the contrary, that they calculate upon its early and effectual completion. They entertain no doubt, that the receipts from canal tolls within the year 1830 will justify the expenditure of three millions that year if such a sum be required, and will increase from that time in a ratio fully equal to the further wants of the commonwealth in executing its system. In proof of this they remark, that during the whole of next season 103 miles of valuable canal will be in full operation; that at the commencement of the year 1830 the quantity navigable will be 290 miles, and that within the last mentioned year it will be extended to 350 miles, embracing sections, equalled by none other in promise and importance.

They have based their calculations as to the practicability and

consequences of the plan proposed, upon facts, which they regard as established, and they look to its adoption, or that of some other corresponding in principle, however different in detail, as essential to the preservation of public confidence, and the ultimate success of the improvements begun.

By the report of the board in December last, the amount of contracts then existing was estimated at about $2,050,00 , and this amount was soon after increased to about $2,350, 00, by additions on the Susquehanna and Juniata division, which included a bridge across the Susquehanna, an aqueduct over the Juniata, a set of out-let locks and about 4 miles of canal.

To meet these contracts, the means of the board have been

1, The balance then remaining of the appropriation of 1827, about $ 400,000

Appropriation of 1828, 2.000,000

2,400,000

Of this sum however, $150,000 have been diverted to other objects. The expenditures on new lines subsequentiy put under contract, amount to $1 0,000, and about $40,000 have been drawn from the treasury, for surveys, damages, expenses of the board and other contingent items.

This statement has been made to account for the fact, which has in a different form, been communicated to the legislature. that the appropriation of 1828 is already exhausted, and that the exigencies of the service call for a further and immediate supply Further particulars as to the precise objects to which the funds have been applied, will appear by the reports of the several acting commissioners and superintendents annexed hereto.

One or two subjects remain to be presented for consideration.

At the present session of the board, a statement has been made from a quarter entitled to great respect, that a communication between the Pennsylvania canal along the west branch with the river at a point opposite Lewisburg, will be productive of convenience to a large section of valuable country. The board appreciate fully the importance of the district, which this arrangement would accommodate, and they do not hesitate to recommend the subject to the consideration of the legislature. What may be the precise cost of such a communication, and upon what plan it might most easily be effected, they are not at this time prepared to say, but they apprehend no serious difficulty upon either point, if an opportunity be given for proper examination.

In a number of instances the mode of constructing the lines of improvement have already, or will hereafter produce a large amount of water power, which may be disposed of on profitable terms to the commonwealth, without injury to the public works. The dam across the Susquehanna at Shamokin, and the various dams along the Conemaugh, Kiskeminetas and Juniata, are prominent examples. At present no available power to sell or lease such water rights, exist in the board, and as the time is approach-

ing, when they may easily be made a source of revenue, the subject is urged upon the attention of the legislature.

Under the existing laws, authorising the commissioners to make the necessary contracts for the construction of canals, a doubt has arisen at the accounting department, whether contracts for repairs done to the work, after it has been taken off the hands of the original contractor, can be considered as included. A modification of the law is therefore asked, which will enable the board promptly to make and pay for such repairs, as may be required on the lines of canal. Such lines cannot be regarded as complete, until the water has been admitted, and the accidents attending a first trial of their strength have been remedied. In general, these repairs will be made by the acting commissioner or superintendant having charge of the nearest unfinished line. In one instance however, it has already occurred, that the acting commissioner could not find time for this additional duty. The board have therefore, appointed a supervisor to take charge of the western division, as far as completed, and to direct the making of all necessary repairs.—The same necessity may probably exist in other quarters before the close of the year, and it will be convenient that such officers have power to obtain the funds required immediately from the treasury. It is proposed therefore. that all supervisors of canal lines, who may be appointed by the board, shall give bond to the commonwealth, in the sum of $10,000, and shall be permitted to draw money to that amount, under similar restrictions, and with obligations to account, similar to those prescribed in the case of acting commissioners and superintendants.

Signed by order of the Board,

DANIEL MONTGOMERY,
President.

Attest,
JOSEPH M'ILWAINE, *Secretary,*
Canal Office.
Harrisburg, December 11, 1828

Series 1.

DOCUMENTS RELATING TO THE WESTERN DIVISION.

No. 1.

Report of Abner Lacock, acting commissioner on the Western Division.

To the Board of Canal Commissioners.

GENTLEMEN,

The superintendance of the line of canal from Pittsburgh to Johnstown, a distance of about one hundred and ten miles, and the exploration of the country and location of a rail road, from the latter point to Frankstown, on the Juniata, a distance of about fifty miles, has been committed to my care. It would swell a report beyond the necessary limits, to go into a detail of the operations upon a line of such magnitude and extent: for that information, the board is referred to the reports of Messrs. Roberts, Harris and Livermore, engineers on the respective branches of the work.

The whole sum expended by me, in the progress and construction of those works, has amounted to $1,401,391 97. And the amount of money received from the treasurer of the canal fund, has been $1,324,609 40—leaving a balance in my favor of $76,782 57. Since my last report, I have received out of the treasury $814,109 40; and of that sum I have paid, for work done under contracts on the aqueduct, over the Allegheny river at Pittsburg, the tunnel through Grant's Hill, the lock, embankments and other works, connected with that branch of the canal, the sum of $80,963 35.

The expenditure upon the line from the Allegheny river, including the river lock and harbour, to the mouth of the Kiskiminetas, a distance of about thirty miles, is equal to $206,818 59.

From the Allegheny line, including the aqueduct across that river, and proceeding up the Kiskiminetas, to the head of the salt works, a distance of about twenty miles, there has been expended $228,571 66.

From the salt works to the out-let lock above Blairsville, about twenty-seven miles, the sum of $333,420 17.

The foregoing expenditures do not include the several sums paid for damages, incidental expenses and superintendance. The line of canal from the out-let lock to Johnstown, was put under contract on the 20th of October last, so far as regards the construction of the canal, excepting the locks and culverts. Agreeably to the instructions of the board, proposals were invited for constructing locks of wood and stone, on two plans pointed out by the engineer; and, likewise of stone locks of the usual construction. Up-

on an examination of the bids, and a comparison of the prices proposed for the erection of the different kinds of locks, it appeared that the difference between the wooden and stone locks, was much less than had been anticipated: it was therefore thought advisable to defer entering into contracts until the board could be consulted on the propriety of the course to be adopted, in relation to this subject. As no estimate has been made, or money paid to contractors on this line of canal, the amount of work done cannot be stated with precision. Several contractors, however, have commenced their work, and many hands are actively employed on the line.

The continuation of high water until the season had far advanced, retarded the progress of the contractors employed in constructing aqueducts, dams and river locks; nevertheless, water has been let into the canal at the salt works, on the Kiskeminetas, fifty-five miles above Pittsburg, and carried over the large aqueduct across the Allegheny river; and in a short time it is expected the navigation will be open to the city of Pittsburg. With the opening of this navigation, great and unceasing exertions have been made to extend it this fall to the northern turnpike at Blairsville. The first estimate on this line of near thirty miles, was paid in March last; and since that time the excavation of the entire line has been nearly completed. Three dams across the river have been erected; sixteen stone locks; an aqueduct of five arches of fifty-four feet span, of entire stone built, besides several over lateral streams; about eight hundred feet of a tunnel has been excavated through a mountain. The river aqueduct and tunnel, however, are not completed, but are in such a state of forwardness, that little doubt can be entertained that the navigation will be opened early in the spring.

Agreeably to the instructions of the board, Messrs. Roberts, Livermore and Harris, were directed to make an examination, under my direction, of the highest convenient and practicable point, to which the canal should be extended up the Conemaugh. To that report you are referred in relation to the facts connected with this subject. Before closing this report, it is proper to observe that beside the enhancement in the price of labor and supplies, the contractors have suffered to some extent from my inability in many instances to make payments at the time, and in a currency that would pass without a discount. This state of affairs arose from the following causes: from being limited by law in drawing more than fifty thousand dollars, the amount covered by the responsibility of my securities, until my accounts were settled at the treasury; and thus kept within that limit beside the engineer corps on a line of about 100 miles, I was obliged to pay four or five estimates every month, some of which amounted to more than $60,000. Thus circumstanced, and placed at a distance from the seat of government, it was impossible for me at many times to transmit vouchers, and have my accounts settled at the treasury,

in time to meet my engagements with the contractors; and consequently, I was frequently obliged to overdraw my credits in the banks of Pittsburg and Westmoreland, to the amount of seventy or eighty thousand dollars, and make myself personally liable for the same. This measure was cheerfully acquiesced in by the officers of those monied institutions, from what appeared to me a sincere desire to lend their aid to promote the important objects contemplated by the government. At length, however, my drafts were not paid at the treasury, for the best reason in the world, because there was no money legally applicable to the canal fund in the hands of the treasurer. Thus situated, no alternative presented itself to me, but either to stop the work, ruin contractors and labourers, and destroy public confidence, or issue certificates of debt to the contractors: this I did without hesitation, to the amount of about $150,000. These certificates were received at par by the contractors, and redeemed by the banks at a discount of not more than one per centum. It is but fair to state, that those embarrassments have arisen, not from any neglect or omission on the part of the constituted authorities of the state, nor from their inability to meet their legal engagements, but to the impossibility of ascertaining with any thing like precision, the amount of labor to be done from month to month, and consequently, the sums that would be required to carry on the extensive works now in operation. But from whatever cause those embarrassments may have arisen, it would be but an act of justice for the contractors to receive a complete indemnity from the government; and I respectfully suggest the propriety of recommending their case to the consideration of the legislature.

A. LACOCK,
Acting Commissioner.

No. 2.

Report of the Allegheny and Pine Creek lines, by James D. Harris, Engineer.

Estimate of work remaining to be done on the Allegheny line, Western Division, Pennsylvania canal.

At Hill-slips,	$3,000 00	
Conveying water around locks,	2,000 00	
Roads contiguous to canal,	200 00	
Bridges,	600 00	
Fences,	150 00	
Slope wall adjoining aqueducts,	100 00	
Painting,	160 00	
Caulking and pitching,	40 00	
Puddling and repairs,	1,800 00	
		$8,050,00

Estimate of work, remaining to be done on the Fine Creek Line, Western Division, Pennsylvania canal. This line includes the lower aqueduct across the Allegheny, and all the work on the Pittsburg side.

At Slips,	$ 3,274 50	
Roads,	1,033 50	
Aqueducts,	46,500 00	
Embankments,	3,200 00	
Bridges,	500 00	
Conveying water around locks,	450 00	
Fences,	150 00	
Draining inundated land,	1,500 00	
Puddling,	800 00	
Wall to protect E. abutment of aqueduct at Washington street,	1,200 00	
Tunnel job,	32,000 00	
Lock houses,	900 00	
		$91,058 00
		$99,108 00

The foregoing is a statement of work remaining to be done on the Allegheny and Pine creek lines of the western division of the Pennsylvania canal, with an estimate of the cost of the same.

JAMES D. HARRIS, *Engineer.*

Pittsburg, 24th November, 1828.

To the Board of Canal Commissioners of Pennsylvania.

To the Board of Canal Commissioners of Pennsylvania.

GENTLEMEN,

I beg leave to report to you the situation of the work on the Allegheny and Pine creek lineas of the western division of the canal.

The accompanying statement shows that but little remains to be done to complete the Allegheny line entirely, and that a considerable part of the expense yet to be incurred on that line, is for the purpose of bringing the water around the locks. This is doing in such a manner, that the water power may be used to the best advantage. This, with the lock houses was not estimated in the last report.

The hill-slips have been removed entirely on both lines, where not too extensive. Where it was found too expensive to remove the whole mass, the canal has been made much wider than usual, that there may always be sufficient room for the boats to pass. But as an additional security, and to prevent trouble from the earth slipping in future, which would be a serious inconvenience after the opening of the navigation, it will be advisable to continue a

force through the winter at the points where there are any indications of a disposition to slip The doing this however, need not interfere with the passage of boats, should the season be sufficiently open. An estimate is made for puddling and repairs, under the expectation that in the progress of letting in the water, some work of this description will be required.

The necessity of moving the line of the canal into the hill, renders it difficult to make the road which runs parallel and close to the canal for a considerable distance. A great part of the excavation on the Pine creek line, was occasioned by this necessity. The great breadth of base required for both canal and turnpike road, and the hill being steep, the depth of cutting was increased in a great ratio. This, together with the slipping character of the ground, makes it troublesome and expensive to construct both canal and road between the hill and the river, and has tended much to swell the cost of the Pine creek line.

In laying the formation of the out-let lock and pier head in Allegheny-town, great difficulty was experienced from the influx of the water through a loose bed of gravel, of which the bottom consisted. The length of masonry was 220 feet, which was sunk 7 feet below low water of the river, and the harbor 50 feet in breadth, and in length 120 feet was excavated to the depth of 4 feet below low water. Much of the labour of men and horses had to be expended in pumping, which forms a large item of the cost of this work.

That part of the canal extending across the Allegheny through Grantshill to the Monongahela, is in a state of forwardness proportioned to the magnitude of the work. The abutments and three of the piers of the aqueduct over the river are raised nearly to the full height; the remaining three piers are raised so high, as to be out of danger of injury. A great part of the superstructure is prepared, ready to set up, and the securing the foundations of the abutments and piers is going forward. The work done at the tunnel and lock contract during the summer, has been chiefly confined to the locks. The out-let lock at the mouth of Suke's run is built to the height of the lift; the stone work of the three remaining is nearly finished, and the gates framed. The tunnel for the length of 85 feet at each end has been cut down to bottom. The arching of this distance and filling above the arch is going on, and the tunnelling about to be recommenced.

The tunnelling proves to be difficult. The material of which the hill consists being so hard as to require blasting, but not sufficiently firm to stand without arching. The main exertion of the contractors will now be directed to the completing the tunnel, and it may be expected that a correspondent progress will be made.

Respectfully submitted,

JAS. D. HARRIS, *Engineer.*

Pittsburg, 24th November, 1828.

No. 3.

Report on the Kiskiminetas and Conemaugh lines, by Alonzo Livermore, engineer, including estimates, &c.

To the Board of Canal Commissioners of Pennsylvania.

Gentlemen,

In obedience to the directions of Gen. Lacock, the acting commissioner, I herewith give a statement of the present state and progress of the work, upon the Kiskiminetas and Conemaugh line of canal under my superintendance, together with an estimate of work to be done before completion.

The amount of work yet remaining is calculated by the several assistant engineers, upon their respective lines, and comprehends all items contracted for, with a liberal allowance for hill-slips, and other contingencies.

It will be observed, that the amount which this canal will have cost when completed, will exceed the estimate of last season the sum of $117,000.

Many causes have combined to produce this increase of expenditure. In the first place enormous slips have come into the canal and lock pits; in one instance at guard lock No. 5. lift No. 4, and canal adjoining the increase of the excavation by this cause, will not cost less than $20,000. It is worthy of remark, that should a canal have been adopted instead of slack-water navigation for the first three miles of this line, the slips which would have occurred, added to the natural expense, would increase the cost to not less than $40,000 per mile, thereby saving in this instance by slack-water to the amount of $75,000 Indeed it would be found, whenever this kind of navigation is adopted either on this or the Kiskiminetas line, that prodigious expenses have been saved by avoiding the foregoing difficulties.

It was my opinion last season, as well as others better acquainted with the country, that the incidents attendant upon the above would be trifling, both upon this and the Kiskiminetas line. My calculations have come far short of the amount of actual cost in these cases. Whenever the base of the hill has been disturbed by the formation of the canal, without exception the whole body of loose rock and earth has come in from the front of the hill, and in many cases swelled the amount of the excavation to more than double what was calculated. The principal sections where these difficulties have occurred are Nos. 87, 92, 93, 94, 97, 98, 111 and 112. In some instances the towing path has slid from its base, and a farther excavation into the solid rock to secure a permanent foundation for the banks.

The expense upon sections Nos. 111, 112, 118 and 119, will be increased by a removal farther into the solid rock, owing to the confined situation in which the river flows, which would endanger the banks, if made higher and of clay embankment.

There is an additional expense upon the aqueducts of $27,000. The original contract for the aqueduct across Blockley's creek, was forfeited and a higher price given. The foundation of this and Stony run was also more expensive than estimated. An aqueduct over Mill creek has been built where a culvert was intended. The great increase is upon the stone aqueduct over the Conemaugh. This was originally estimated at $28,000, the amount of the stone work was expected to be about 4,750 perches, and was soon after contracted for at $5 75 per perch, which would have come to more than the estimate. It was found in laying out the work that the intended length would not be sufficient to secure the abutments from ice and driftwood; an additional length was added, consequently an increase of the number of perches. It was found that the contractor who first took this job, had not a sufficient price for the work to carry on with that vigor that was necessary. They had already expended their private funds, (as I understood, to the amount of $2000,) and involved themselves considerably in debt, which made it necessary for them to give up the contract.

A much greater price was requisite to carry on the work, owing to the lateness of the season, than would have done in the first instance.

The cost of this work will nearly equal the sum of $50,000.

Additional expenses have been put upon the dams, by substituting iron instead of wooden pins, increasing the thickness of the plank, adding more stone and wood work to the abutments, and facing the breast with two inch plank.

The expense of waste wiers is included in this estimate and were before not calculated.

The foregoing items make up the most of the increased cost of the canal in comparison with the last year's estimate.

The following work, or extension has been added since last season, sections No. 124 and 125 a piece of canal adjoining of six chains, an out let lock No. 17 of 10 feet lift, a towing path, bridge and culvert, amounting in all to $19,000.

A few general remarks remain to be made. This line of 25 miles in extent, may be said to be in a forward state. Many difficulties have been encountered which materially retarded the work; a great scarcity of hands existed in the best part of the last season. The weather has been unusually wet, not a month has passed without a considerable rise in the river. This has been particularly unfortunate for the contractors of dams. They are now however, nearly secured; a small rise of about 3 feet in the river took place a few days since, the dams were filled, and the water passed over without doing any injury. If three weeks of good weather continue, they can be secured from danger.

The arches of the stone aqueduct, will be closed in about fifteen days; the upper works can be done by the time wanted.

The tunnel is excavated upwards of 700 feet, and can be easily finished during the winter

I feel confident, if no material accident happens to any of the works, that the canal will be ready for the water by the opening of the spring.

A great proportion of the sections and locks, will be finished by the next estimate.

All of which is respectfully submitted.

ALONZO LIVERMORE.
Engineer.

Canal line, Nov. 27th, 1828.

Total amount of work to be done at the estimate of November 10th, 1828. $120,415 97

A. LIVERMORE,
Engineer.

No. 4.

Estimate of the cost of Ligonier line.

Report and Estimate on the Ligonier line from Blairsville to Johnstown—by James D. Harris, Engineer.

Lock, section No. 1. 6 chains—no contract.

Grubbing 6 chains, at	$7		$ 42	
Excavation of earth 4000 yds at	8 cts		320	
Embankment	3398	12	407 76	
				769 76

Section No. 1. 36 chains.

Grubbing 11¼ chains at	$6		69	
Excavation of earth 9942 yds at	8 cts		795 36	
Embankment	4527	8	362 16	
				1226 52

Section No. 2. 36 chains.

Grubbing 10 chains			65	
Excavation of earth	9324 yds	6¼ cts	606 6	
Embankment	7053	8	564 24	
				1,235 30

Lock, section No. 2. 6 chains—no contract.

Excavation of earth	3652 at	8 cts	292 16	
Embankment	2280 at	12	273 60	
				565 76

Section No. 3.

Grubbing 25¼ chains			225	
Excavation of earth	14,000 at	8 cts	1,120	
Excavation of rock	2,178	35	760 55	
				2,105 55

Lock section No. 3. 6 chains—no contract.

Grubbing 6 chains at $7			42
Excavation of earth	5478	12	657 36
Embankment	540	12	64 80
			764 16

Section No. 4. 24 chains.

Grubbing 24 chains			250
Excavation of earth	16,816 at	8	1,345 28
Excavation of rock	8,408	37½	3,153
			4,748 28

Section No. 5. 27 chains.

Grubbing 6 chains			50
Excavation of earth	8,094 at	7	566 58
Embankment	18,984	8	1,518 72
			2,135 30

Section No. 6. 27 chains.

Excavation of earth	9,774 at	6	586 44
			586 44

Lock section No. 4. 6 chains—no contract

Excavation of earth	3,910 at	10	391
Embankment	1,500	12	180
			571

Section No. 7. 30 chains.

Grubbing 2½ chains,			10
Excavation of earth	9960 yds,	7 c	697 20
Embankment	1650	9	148 50
			855 70

Section No. 8. 30 chains.

Grubbing 24 chains			200
Excavation of earth	10,460 at	7	732 20
Excavation of rock	1,000	31	610
			1,242 20

Dam section No. 1. 6 chains.

Grubbing 6 chains at		$7	42
Excavation of earth	180 at	8	144
do. rock	550	40	180
Embankment	1,200	10	320
			686

Section No. 9. Tow path, 30 chains.

Grubbing 30 chains			180
Excavation of earth	4,000 at	7	280
Excavation of rock	2,000	31	620
Embankment	3,000	9	270
			1,350

Section No. 10. *Tow path*, 30 *chains.*

Grubbing 30 chains			300	
Excavation of earth	3,000 at	7	210	
Excavation of rock	2,000	34½	690	
Embankment	3,000	10	300	
				1,500

Section No. 11. *Tow path*, 24 *chains.*

Grubbing 24 chains			293	
Excavation of earth	3,500 at	7	245	
Excavation of rock	1,800	42	756	
Embankment,	3,000	9	270	
				1,564

Lock section No. 5. 6 *chains—no contract.*

Grubbing 6 chains, at		$ 7	42	
Excavation of earth, 5,000 chains		12	600	
Embankment, 1,500		12	180	
				823

Section No. 12, 21 *chains.*

Grubbing, 21 chains,			180	
Excavation of earth, 13818	at	8	1,105 44	
				1,285 44

Dam section No. 2. 6 *chains.*

Grubbing 6 chains at		7	42	
Excavation of earth, 5478	at	10	547 80	
				589 80

Section No. 13. *Tow path* 36 *chains.*

Grubbing 36 chains,			150	
Excavation of earth, 5500	at	6½	357 50	
Rock,	500 at	40	200	
Embankment,	4000	7	280	
				987 50

Section No. 14. *Tow path* 33 *chains.*

Grubbing 33 chains,			250	
Excavation of earth 6000	at	7¼	435	
Rock,	500	45	225	
Embankment,	8000	9	270	
				1,180

Section No. 15. *Tow path* 33 *chains.*

Grubbing,			500	
Excavation of earth, 5500	at	8	440	
Rock,	1000	40	400	
Embankment,	3000	9	270	
				1,410

Lock section No. 6. 6 *chains—no contract.*

Grubbing 6 chains,			42	
Excavation of earth 5000	at	12	600	
Embankment,	2000	10	200	
				842

Lock section No. 7. 6 chains—no contract.

Grubbing 6 chains, at		7	42	
Excavation of earth	2910	15	436 50	
Embankment,	2000	10	200	
				678 50

Section No. 16. 30 chains

Grubbing 30 chains,			190	
Excavation of earth,	18260	7	1,278 20	
Rock,	3000	45	1,350	
Embankment,	8000		640	
				3,458 20

Lock—section No. 8. 3 chains—no contract.

Grubbing 3 chains, at		7	21	
Excavation,	1914	20	382 80	
Embankment,	1500	10	150	
				553 80

Section No. 17. 30 chains.

Grubbing 30 chains,			120	
Excavation of earth,	4760	7	333 20	
Rock,	2380	30	714	
Embankment,	12000	8	960	
				2,127 20

Lock section No. 9. 3 chains—no contract.

Grubbing 3 chains, at		7	21	
Excavation,	1,974	20	394 80	
Embankment,	1,200	12	144	
				559 80

Section No. 18. 30 chains.

Excavation of earth,	18,326 at	6	1,099 56	
Rock,	4,108	30	1,232 40	
Embankment,	9,648	8	771 84	
Wall,	3,278	50	1,639	
Puddling,	2,300	20	460	
				5,502 80

Lock—section No. 10. 6 chains—no contract

Grubbing 6 chains,		7	42	
Excavation,	1,660	20	332	
Embankment,	3,000	10	300	
				674

Section No. 19—30 chains.

Grubbing 18 chains,			300	
Excavation of earth,	15,716 at	6 cts.	942 96	
do rock,	7,858	30	2357 40	
Embankment,	16,079	8	1286 32	
Wall,	7,590	50	3795	
Puddling,	1,860	20	372 68	
				9053

Section No. 20—24 chains.

Grubbing 24 chains,			175	
Excavation of earth,	4074 at	7,	285 18	
Embankment,	8486	9,	313 74	
				773 92

Section No. 21. 80 chains.

Grubbing 26 chains			200	
Excavation of earth	7968	7	557 76	
Rock	400	30	120	
Embankment	2988	9	268 92	
				1146 68

Section No. 11.—6 chains.

Grubbing 6 chains	86		86	
Excavation of earth	8948 at	8	315 84	
Embankment	1000	10	100	
				451 84

Lock—Section No 12—no contract.

Grubbing 6 chains at 86			86	
Excavation of earth	2381 at	8	190 48	
Embankment	1500	10	150	
				376 48

Section No 22—30 chains—no contract.

Grubbing 30 chains at 87			210	
Excavation of earth	17595 at	9	1583 55	
Rock	5865	40	2345	
Embankment	2000	10	200	
Puddling	1150	20	880	
Wall	2640	25	660	
				5329 55

Section No. 23—27 chains.

Grubbing 18 chains			100	
Excavation of earth	10364 at	7½	777 30	
Rock	3454	37	1277 98	
Embankment	3000	8	240	
Wall	1584	35	554 40	
Puddling	1600	9	144	
				3093 68

Lock—Section No. 13—6 chains—no contract.

Grubbing 4 chains at 87			28	
Excavation of earth	2346 at	8	187 68	
Embankment	2000	10	200	
Slope wall	352	50	176	
				591 68

Lock—Section 14—6 chains—no contract.

Excavation of earth	2710 at	8	216 80	
Embankment	1200	10	120	
				336 80

Lock—Section No. 15—12 chains—no contract.

Excavation of earth	1000 at	8	80	
Embankment	4639	10	463 90	
				543 90

Section No. 24—24 chains.

Grubbing 12 chains			50	
Excavation of earth	3438 at	6	206 28	
Embankment	38,325	8	3066	
				3322 28

Section No 25— 36 chains.

Grubbing 36 chains			100	
Excavation of earth	9540 at	8	763 20	
				863 20

Section No 26—33 chains.

Grubbing 20½ chains			150	
Excavation of earth	9372 at	7½	702 90	
Embankment	300	11	33	
				885 90

Section No 27—30 chains.

Grubbing 30 chains			150	
Excavation of earth	7325 at	7	512 75	
Embankment	11485	9	1033 65	
				1696 40

Section No. 28—30 chains.

Grubbing 18 chains			150	
Excavation of earth	18743 at	6	1124 58	
Rock	6347	40	2498 80	
				3773 38

Section No. 29—30 chains.

Grubbing 25 chains			150	
Excavation of earth	4980 at	10	498	
Embankment	5250	10	525	
				1173

Lock—Section No. 16—6 chains—no contract.

Grubbing 6 chains at $6			36	
Excavation of earth	2340 at	10	234 60	
Embankment	2500	10	250	
				520 60

Section No. 30—33 chains.

Grubbing 29 chains			200	
Excavation of earth	4848 at	9	436 32	
Embankment	3462	13½	467 37	
				1103 69

Section No. 31. 42 chains.

Grubbing, 9 chains			$ 200	
Excavation of earth	13,944	at 8	1,115 52	
Embankment	3,000	at 10	300	
				1615 52

Section No. 82. 33 *chains.*

Grubbing 15½ chains,			45	
Excavation of earth,	14,634	at 7	1,024 38	
Embankment,	6,076	at 8	486	
Wall,	570	at 50	285	
				1840 46

Section No. 83. 30 *chains.*

Grubbing 30 chains,			100	
Excavation of earth,	11,638	at 6	698 28	
Excavation of rock,	11,638	at 30	3,491 40	
Embankment,	15,984	at 9	1,438 56	
Wall,	1,425	at 28	399	
				6127 24

Section No. 84. 36 *chains.*

Grubbing 19 chains,			125	
Excavation of earth,	5,712	at 7½	428 40	
Embankment,	5,050	at 10	505	
				1058 40

Lock section No. 17. 6 *chains.*

Excavation of earth,	2,632	at 8	210 56	
Embankment,	2,500	at 10	250	
				466 56

Lock section No. 18. 6 *chains.*

Excavation of earth	2,925	at 8	234	
Embankment	2,000	at 10	200	
				434

Section No. 85. 27 *chains.*

Excavation of earth	10,314	at 7	721 98	
				721 98

Lock section No. 19. 6 *chains.*

Grubbing 2 chains		at 86	12	
Excavation of earth	3,010	at 8	240 80	
Embankment	2,000	at 10	200	
				452 80

Lock section No. 20. 6 *chains.*

Grubbing 6 chains		at 87	42	
Excavation of earth	4,692	at 9	422 28	
Embankment	1,500	at 10	150	
				614 28

Section No. 86. 36 *chains.*

Grubbing 23½ chains			150	
Excavation of earth	15,588	at 7¾	1208 07	
				1358 07

Section No. 87. 42 *chains.*

Grubbing 24 chains			150	
Excavation of earth	13,944	7½	1,045 80	
				1195 80

Section No. 38. 30 *chains.*

Grubbing 2 chains			50	
Excavation of earth	8,194	at 8	655 52	
Embankment	16,068	at 10	1606 80	
				2312 32

Section No. 39. 42 *chains.*

Excavation of earth	7140	at 7	499 80	
Embankment,	6,000	10	600	
				1099 80

Section No. 40. 42 *chains.*

Grubbing, 30 chains,			200	
Excavation of earth,	6,640	at 8	531 20	
Embankment,	15,334	11	1,686 74	
				2,417 94

Lock section No. 24. 9 *chains.*

Excavation of earth,	3,981	at 9	358 29	
Embankment,	3,000	10	300	
				558 29

Section No. 41. 33 *chains*

Grubbing 29 chains,			175	
Excavation of earth,	2,068	at 6	124 08	
Rock,	4,136	37½	2,217 60	
Embankment,	27,720	8	2,217 60	
Wall,	1,678	75	1,258 50	
				5,326 18

Section No. 42. 27 *chains.*

Grubbing, 27 chains,			175	
Excavation of earth,	7,425	at 7½	556 87½	
Rock,	7,425	33	2,450 25	
Embankment,	36,640	9	3.207 60	
Wall,	2,517	30	755 10	
				7,144 82½

Section No. 43. 30 *chains.*

Grubbing, 30 chains,			$100	
Excavation of earth,	10,364, at 6 cts.		621 84	
Rock,	3,454,	40,	1,381 60	
Embankment,	12,282,	9¾,	1,197 49½	
Wall,	470,	30,	141	
				3,441 93½

Lock Section No. 22. 6 *chains—no contract.*

Grubbing 6 chains,		at 5	$30	
Excavation of earth,	3,000	10	300	
Embankment	1,500	12	180	
				510

Section No. 44. 42 *chains.*

Grubbing,	42		200	
Excavation of earth,	11,000	9	900	
Embankment,	5,590	10	559	
				1,749

Section No. 45. 36 *chains.*

Grubbing,	36		300	
Excavation of earth,	10,224	at 8 cts.	817 92	
				1,117 92

Section No. 46. 33 *chains.*

Grubbing,	33 ch.		300	
Excavation of earth,	7,872	at 8 cts.	629 76	
Rock,	1,500	37	555	
				1,484 76

Lock Section No. 23. 6 *chains—no contract.*

Grubbing,	6 ch.		36	
Excavation of earth,	2,800	at 10 cts.	280	
Embankment,	1,500	12	180	
				496

Section No. 47. 21 *chains.*

Grubbing,	21 ch.		250	
Excavation of earth,	6,904	at 7½	517 80	
Rock,	6,904	31	2,140 24	
Puddling,	2,172	20	434 40	
				3,342 44

Dam Section No. 3. 9 *chains.*

Grubbing,	9 ch.	87	63	
Excavation of earth,	3,519	10	351 90	
Rock,	3,519	40	1,407 60	
				1,822 50

Section No. 48. *tow-path,* 36 *chains.*

Grubbing,	36 ch.		250	
Excavation of earth,	4,000	at 7½ cts.	300	
Rock,	3,000	31	930	
Embankment,	1,500	8	120	
				1,600

Section No. 49. *Tow-path* 36 *chains.*

Grubbing,	36 ch.		290	
Excavation of earth,	3,000	at 8 cts.	240	
Rock,	3,000	40	1,200	
Embankment,	1,500	10	150	
				1,830

Section No. 50. *Tow-path,* 36 *chains.*

Grubbing,			200	
Excavation of earth,	4,500	at 8½	362 50	
Rock,	1,500	41	615	
Embankment,	1,000	9½	95	
				1,272 50

Section No. 51. Tow-path 36 chains.

Grubbing,	36 ch.		185	
Excavation of earth,	6,000 at	8¼	495	
Rock,	1,000	40	400	
				1,080

Section No. 52. Tow-path, 36 chains.

Grubbing,	36 ch.		410	
Excavation of earth,	6,000 at	9	540	
Rock,	1,000	37½	375	1325

Section 53 Tow-path 39 chains.

Grubbing,	39 ch.		320	
Excavation of earth,	8,000 at	9 cts.	720	
				1040

Lock Section 24 9 chains—no contracts.

Grubbing,	9 ch. at	$7	63	
Excavation of earth,	1,350	12	1,620	
Embankment	500	10	50	
				1,733

Section No. 54. Tow-path, 42 chains.

Grubbing,	42 chains,		300	
Excavation of earth,	7,000 at	8 cts.	560	
Rock,	1,000	37½	370	
				1230

Section No 55. T. P. 33 chains.

Grubbing 33 chains.			340	
Excavation of earth	4000 at	7	280	
Excavation of rock	2000	40	800	
				1,420

Section No. 56. 39 chains.

Grubbing at 39cts.			285	
Excavation of earth	12,195 at	8	975 60	
Excavation of rock	4,065	33	1,341 45	
				2,602 05

Lock Section No. 25. 6 chains—no contract.

Grubbing 6 chains	$7		42	
Excavation of earth	3,600 at	10	360	
Embankment	2,000	12	240	
				642

Lock section No. 26. 6 chains—no contract.

Grubbing 6 chains at	$7		42	
Excavation of earth at	3,600	10	360	
Embankment	1,500	10	150	
				552

Lock section No. 27 9 chains—no contract.

Grubbing 9 chains at	$7		63	
Excavation of earth	4,050 at	10	405	
Excavation of rock	1,350 at	40	540	
Embankment	500	12	60	
Slope wall	1,000	50	500	
				1568

Section No. 57. 36 chains.

Grubbing 20½ chains				200	
Excavation of earth	7,968	at	7	567 76	
Excavation of rock	3,984		39	1,553 76	
Embankment	10,880		9	979 20	
Slope wall	713		50	356 50	
					3,647 22

Section No. 58. 42 chains—no contract.

Grubbing 15 chains				150	
Excavation of earth	8000	at	10	800	
Embankment	8,700		10	870	
					1,820

Lock section No. 28. 6 chains—no contract.

Excavation of earth	2,346	at	10	234 60	
Embankment	1,500		12	180	
					414 60

Section No. 59. 42 chains—no contract.

Grubbing 15 chains				150	
Excavation of earth	14,634	at	8	1,170 72	
Embankment	7,500		10	750	
					2,070 72

Section No. 60. 42 chains—no contract.

Grubbing 35 chains				200	
Excavation of earth	3,000	at	10	300	
Embankment	21,000		10	2,100	
					2,600

Lock section No. 29. 6 chains.

Grubbing 6 chains	87			42	
Excavation of earth	5 000	at	12	600	
Embankment	2,000		10	200	
					842

Section No. 61—42 chains.

Grubbing 39 chains				300	
Excavation of earth	6390	at	10	639	
Embankment	20,600		10	2060	
					2999

Section No. 62—42 chains.

Excavation of earth	5880	at	8	470 40	
Embankment	16,458		10	1645 80	
					2115 20

Section No 63—42 including harbor and basin at Johnstown.

Excavation of earth in canal	10,800	at	10	1080
in clearing out and shaping harbor in channel of river	5000	at	40	2000

No contract.

Excavating basin	5555	20	1111	
Embankment between basin and dam	1200	12	1440	
Facing embankment with stone	3000 per. at	75	2250	
Docking 1600 feet at $1,50			2400	
				10281
				$171,150 96

LOCKS.

Lock No. 1	Lift 9 feet	1010 perches	$4 75	$4757 50
2	8	925	4 50	4162 50
3	10	1113	4 50	5008 50
4	5	700	4	2800
5	11	1257	3 75	4713 75
6	12	1400	3 75	5250
7	8	925	3 75	3468 75
8	8	925	3 75	3468 75
9	7	845	3 75	2957 50
10	8	925	3 75	3468 75
11	6	750	4	3000
12	6	750	4	3000
13	7	845	4	3380
14	7	845	4	3380
15	7	750	6	4500
Attached to aqueduct,				
16	8	925	4 25	3931 25
17	8	925	5	4625
18	8	925	5	4625
19	8	925	5	4625
20	7	845	5	4225
21	6	750	3 75	2812 50
22	8	925	4	3700
23	8	925	3 75	3237 50
24	8	850	3 75	3167 50
Attached to guard lock.				
25	12	1400	3 75	5250
26	8	925	3 75	3237 50
27	8	925	3 75	3237 50
28	7	845	4	3380
29	8	925	4 50	4162 50
30	3	1600	4 75	7600
Guard and lift combined.				
Guard lock No. 1		1500	3 75	5625
2		1500	4	6000
3		1500	3 75	5625
4		1500	3 75	6625
				$142,027 25

AQUEDUCTS.

Aqueduct across Tubmill creek, stone entire,	1700 perches	6 00	10,200
Aqueduct across Conemaugh, stone entire,	6500	6 00	39,000
Aqueduct across Hingstons run, stone abutments.	1000	3 00	3000
No contract, wooden trunk,	60 feet	10	600
			$52,800 00

CULVERTS.

Culvert on Sec. No. 5	chord 6 feet	150 perches	$ 3	450
7	3	90	3	270
18	3	110	2 50	275
19	3	60	2 50	150
27	10	200	3	600
34	10	250	3	750
38	10	250	3	750
41	4	140	2 50	350
43	12	300	3	900
44	6	1 0	3	450
2 on 57	10 each	460	2 50	1150
58	3	100	3	300
60	4	120	3 50	420
				$ 6815 00

DAMS.

Dam No. 1,	$250 00	
Add for iron additional	150	8400
Dam No. 2,		9990
3,	9468 00	
Add for iron additional,	150	9618
4,		84 0
5, Johnstown, 13 feet high 160 long $18		2880
No contract.		
		$39,288 00

GUARD GATE AT JOHNSTOWN.

Guard Gate 1, $1500	1500

WASTE WIERS.

Waste Wiers, 22 at 500	11,000

TOWING PATH BRIDGES.

T. P. bridges containing 1900 perches masonry at $3,	5700
T. P. containing 350 feet wood work, 4 per foot	1000
	$6700 00

BRIDGES ACROSS CANAL.

Bridges 31, at $150	$4,650 00
Embankments at bridges, 35,000 yards at 12,	3,000 00
Lock Houses.	
Lock Houses, 29 at $300	8,700 00
Fence.	
Fence, 8000 perches at 75	6,000 00
Roads.	
Road contiguous to canal to be made 860 perches at $150	1,290 00

RECAPITULATION.

Expense of sections,	$171,150 96
do. Locks,	142,077 25
do. Aqueducts,	52,500 00
do. Culverts,	6,815 00
do. Dams,	39,288 00
do. Guard gate,	1500 00
do. Waste wiers,	11,000 00
do. Tow-path bridges,	6,700 00
do. Bridges over canal,	7,650 00
do. Lock houses,	8,700 00
do. Fence,	6,000 00
do. Road,	1,290 00
Cost of 28 miles, 52 chains,	$454,921 21
Add 10 per centum for contingencies,	45,292 12
	$500,213 33

The foregoing is an estimate of the probable cost of 28 miles and 52 chains of canal, ending at Johnstown, and including a basin and harbor at that place.

From inspecting the proposals for locks given at the letting, it appears that no material saving in the first cost, will eventuate in the construction of wooden locks instead of stone; and in consequence no lock contracts having been entered into, the estimates are made for stone locks.

The plans and specifications exhibited were: First, for the immersed or crib lock. This lock was to be built of square timber, in the manner of crib-work, and planked next the chamber; the crib-work to extend from the head of the lock to the lower gates, and to be filled in with stone, but left open enough to allow the water to pass around the head of the lock, through and among the stone and timber, as far as the crib-work extends. These to be secured by sheetpiling, and puddled to the end of the wings, to prevent the water passing outside of the lock farther than the end of the crib-work. From the lower gates to the end of the wings, the walls to be built of stone, as in stone locks.

2d. For locks built of rough stone laid in mortar. To be planked next the chamber, on timbers built into and bolted to the wall; the walls to be of the usual size of stone locks. This kind of work to extend from the head of the lock to the lower gates. Below that to be built of stone in the usual way: upon these two plans, both mitre sills and the upper hollow quoins to be of wood.

3d. For stone locks entire, as they have been usually built on the western division.

It is thought best to build the part of the lock below the lower gates of stone in all cases, as the water could never be more than 4 feet on that part. It would therefore be subject to decay so rapidly, that the interest of the difference in cost between wood and stone, would not compensate for the inconvenience of frequent repairs.

The foundation and the lock, culvert and paddlegates, are the same on the three plans, except that fewer foundation timbers are required for the crib lock than for either of the others.

The expediency of adopting the frame lock was considered of, but it was thought objectionable, particularly for heavy lifts, and in all cases where the walls must be high as the timbers must either be exposed to the action of the weather for most part of the height, or be surrounded by a bank of earth which this kind of lock, from the nature of its construction, is illy calculated to sustain. In either case, the timbers would be liable to decay quickly. Filling in the frame with stone, and surrounding the timbers with water as in the crib lock, might answer the purpose, but it would be more expensive than the crib lock without possessing any advantage over it.

I would observe that the materials for stone locks are abundant and very convenient almost the whole length of the line, and the timber in the neighborhood is generally of an inferior kind.

The estimates of the sections, aqueducts and dams, are made out at the contract prices, except where marked "no contract." No contracts having been made for any other part of the work, the estimates have been made out at such prices as it is supposed it might be done for.

Preparations are making generally on the line as far as let, for a vigorous prosecution of the work. Many sections are already commenced

Respectfully submitted,

JAMES D. HARRIS, *Engineer.*

To the board of canal commissioners
of Pennsylvania.
November 24, 1828.

1

STATE, from the commencement of the work to this date,
l ending at Section 92, near Pine Creek.

No. of Sections.	Miscellaneous.	Total.
Adjoining Aqueduct.		1000 96
		3523 56
No 61	rubbing 43 stumps at $1 on Long slope.	2416 03
		250
62		643 92½
63		441 10
64		2027 48
		1227 52
66		335 32
		283 14
		4896 54
67		2700 00
68		2125 67
69		4630 78½
70		4456 24½
71	king 100 ps. road at $1.	3844 31
72	king 165 ps road at $1 grubb. on slips $105	5939 70
73	king 111 ps. road & grubbing on slip $123 25	2978 85
		410 60
74		10840 38
75		2065 99½
76	dling 66 yds at 20 cts.	1088 26
77		494 00
78		8539 63
79	ving house and stable $15.	1376 06
80		856 77
	bbing additional breadth $5,	1268 52½
81		1343 66
82		5219 35
83		
84	bbing on long slope $50.	1176 20
85		1154 76½
86	bbing 1 stump 75 cts.	560 99½
87		402 10
88		725 53
89	bbing 7 stumps $8.	450 86½
90		1228 68⅝
	bbing 5 chains at $5	902 80
91	ing fence $10.	272 76
92	bbing caused by altering line $15;	1640 40
		1493 13
		554 08
		$257510 36½

2d. For locks built of rough stone laid in mortar. To be planked next the chamber, on timbers built into and bolted to the wall; the walls to be of the usual size of stone locks. This kind of work to extend from the head of the lock to the lower gates. Below that to be built of stone in the usual way: upon these two plans, both mitre sills and the upper hollow quoins to be of wood.

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Respectfully submitted,

JAMES D. HARRIS, *Engineer.*

To the board of canal commissioners of Pennsylvania.

November 24, 1828.

STATEMENT of labour done on the Allegheny line, Western Division, of the Pennsylvania Canal, from the commencement of the work to this date, beginning on the north side of the Allegheny river, opposite the mouth of Kiskeminetas, and ending at Section 92, near Pine Creek.

No. of Sections.	Names of Contractors.	Grubbing.	Price.	Excavation of Earth.	Price.	Excavation of Rock.	Price.	Embankment	Price.	Wall.	Price.	Miscellaneous.	Total.
Adjoining Aqueduct.	Le Barron and Lathrop, Spencer and Clark,	9½ ch.	10	Yards. 278	9	Yards. 16571	50	Yards. 837 16368	12 21	Perches. 6000 115	25 75		1000 96 2333 35
No. 1	Peter Collins, John Shields, Gallagher and Patrick.	Section	30	10817 2152 1817	7½ 8 9	4736 2111 2381	33 35 45			6¼ 465 100	75 75 25	Grubbing 43 stumps at $1 on Long slope.	2416 03 1230 76 1560 93
2	Sylvester Alvord & Co.	21 ch.	2	18234	7	865	50	1960	10			Sheet piling $4 removing smoke house $4	1951 88
3	Andrew Arnold,	21 ch.	2	15147	8	753	34	2054	10			Grubbing 13 stumps at $0 25 sheet piling $3.	1731 35
4	M'Farland and Laverty,			7497	6¼							Grubbing 2 stumps and one tree $3.	471 56¼
5	William Bradley,			2351	7			2966 8681	7 21				2100 09
6	Sylvester Alvord and Co.	8¼ ch.	15	8255	6	162	50	12719 19649	8 21				5542 06
7	Given and Bole,	Section	200	14569	9	6862	40	2505	10	492 100	33 75	Grubbing 3 stumps on slip $4 50.	4538 21
8	Beecher, Jones and Co.	21 ch.	4	8746	7	7569	37½	6444	13	3177 1135	37½ 75	Grubbing on slip and long slope $32.	6445 44
9	Nicholas West and Co.	21 ch.	7	12300	8¾	11511	29	8179	11	1715 530 1373	45 75 75	Grubbing on slip $80.	6727 83
10	Daniel Washburn,	Section	200	12013	9	12013	30	2023	13	27 9 1149	45 75 45	Grubbing on slip $64.	7287 86
11	Bull and Everett,	Section	150	16815	9	19590	29	1085	13	1035 178	75 40	Grubbing 56 stumps at $1.	8857 05
12	Barclay and Chamberlain,	21 ch.	600	12585	8	13617	38	5464	10	992 1073	75 40	Grubbing 6 stumps at $1.	7477 86
13	Merill and Dixon,	Section	60	23911	8	8028	39	3773	10	242	26	Grubbing 3 chains additional $35 37 st. piling $2	6010 79
14	Oliver Hartwell,	18 ch.	5	33097	8	8634	37½					Pud. 70 yds. at 18cts grub. on long slope $54 50	6042 61
15	Bartley and Richards,	21 ch.	4	32273	8	7000	35	366	9			Puddling 1410 yds. at 15 cts.	5360 28
16	Samuel R Richards,	13 ch.	4	8928	8¼			4886 11225	9 12½				2597 17
17	Francis Kearnes,	Section	100	11814	8	20	40	7021	11				1825 48
18	Martin and Patrick,	Section	50	11102	7	9	45	350	11			Grubbing additional breadth $20.	882 09
19	M'Farland and Vanslike,	Section	100	18441	7¾	739	50	1881	10			Grubbing caused by altering line $48.	1734 77½
20	Joel B. Calhoun,	Section	100	5139	7	96	29	7866	9				1195 51
21	Mahon and Co.	Section	43 75	8370½	7¼	50	50	662	10			Puddling 57 yds. at 18 cts.	773
22	Michael M'Dermott,	Section	55	9776	6.8								719 77
23	Peter Collins,	Section	40	5869	7			1815	6				559 73
24	Peter Collins, James Gaulagher,	Section	40	1899 2706	7 8	58	40	4403	11			Grubbing caused by widening $24.	137 85 755 76
25	Beecher, Jones and Co.	21 ch.	5	9000	6¾	2921	50	5945	15			Grubbing on hill slip $20.	2689 75
26	Wm. & Jno. Kennedy,	21 ch.	3 50	6315	9	1263	50	4365	11			Grubbing on long slope $20.	1775 50
27	Martin Colp,	Section	100	5408	7			4825	10			Grubbing caused by widening $10.	971 00
28	Nicholas West & Co.	21 ch.	5	4818	7¼			6326	8				984 01
29	Jno. Patrick Donnel,	Section	10	8816	5.8								521 35
30	Wm. Bradley,	Section	55	6215	7			2853	7				634 55
31	Thomas Neel,	18 ch.	5	7842	7	253	53	1197	11			Putting troughs in berm $2.	836 10
32	Bull and Kingsbury,	Section	80	4297	7			2537	9				609 18
33	Castle and Co.	Section	80	6307	7			601	12			Making 71 perches of road at $1.	664 61
34	Castle and Co.	Section	80	5644	7	40	40	1952	12			Grubbing on long slope $5.	727 92
35	Castle and Rhey,	21 ch.	4	7948	7	2049	30	75	10				1442 56
36	Daniel Miller,	Section	105	8230	8	2062	45	2331	10			Grubbing on long slope $10.	1936
37	Richardson and Thayer, William Martin,	60 ps	3	3490 1653	8 7	20 57	35 37½	4339 11610	8 12½			Making 12 perches road at $1. Puddling 155 yds at 18cts grubbing for drain $8	883 32 1633 87½
38	Bull and Everett,	Section	18	2937	7	5	40	5067	9				68 62
39	Freeman Casebeer,	21 ch.	2	7108	8	1495	30	1155	10			Grubbing on long slope $16	1120 61
40	Beaumont and Co.	Section	87 50	7209	7½	1145	45	5129	8			Grubbing on long slope $12.	1405 74½
41	Martin and Patrick,	Section	100	13281	8	5966	40	5362	10			Making 50 ps. road at $1 grub. on long slope $15	3950 08
42	George W. Trout,	21 ch.	6	5454	8½	12055	40					Making 84 ps. road at $1 grub. on long slope $1	8002 09
43	Alexander Osborn, Daley and Barret,	Section	1 50	1639 197 1	7½ 7½	820 1306	35 35					Grubbing on long slope $20	561 37½ 6072 37½
44	Stewart and Keen,	21 ch.	5 25	21303	7.6	10713	36					Grubbing on long slope $45.	5630 93½
45	Stewart and Co.	21 ch.	7	14895	8	5001	49					Making 25 ps. road $1 grubbing and chopping on long slope $37.	3351 09
46	Olcott and Co.	21 ch.	6	354	7.4	7	50						155 69½
	M'Farland and Laverty,			9200	7	4600	40	6478 3666	10 15			Making 48 ps. road at $1 grubbing on slip $75	3729 38
47	Olcott and Co.	18 ch.	4	638	8	12	50						120 04
	John Keen,			13568	8	4375	40	21069	9	199	50	Grubbing on slip $83 75.	4914 50
48	Nicholas West and Co.	21 ch.	2 75	16412	7	5160	38	14658	9			Grubbing on slip $40 making bridge $8 moving fence $7 puddling 114 yds at 20 cts.	4564 41
49	John Keen,	Section	80	11889	8	11	50	5509	11				1592 61
50	John Keen,	Section	80	7812	8	3	50						656 46
51	David Leech,	Section	55	8055	5.8	8	50						526 19
52	Castle and Co.	Section	45	57 8	6¼			264	10			Grubbing caused by moving line $4	436 52½
53	David Leech,	Section	90	7306	5.8			2024	10.8			Grubbing in basin $3 50.	737 84
54	Beaumont and Co. Nathan Waldo,	Section	50	19248	7¼	10	50	51524 7707	8 10				5972 40 779 70
55	David Leech,			8557	5.8							Grubbing 7 stumps $8.	504 30
56	Barclay and Kennedy,			18048	6			4813	9				1471 05
57	Barclay and Kennedy.	Section	50	23613	6.9			17350	9			Bridge across ravine $3 making road $20.	5399 99½
58	Barclay and Kennedy,	Section	15	15772	6½							Wheeling earth beyond the usual distance $30	1070 18
59	Philip Cornyan,	Section	30	10153	6	6	50	2718	6				805 36
60	Beaumont and Co. John Henderson,	14½ ch.	72 50	3666	6½			7844	8			Amount for completing	938 31 250
61	Beaumont and Co. Daniel Gilmartin,	Section	95	8445	6¼			4010	11				643 99½ 441 10
62	Donaldson and Co.			28964	7								2027 48
63	Donaldson and Co.			15436	7			1470	10				1227 52
64	William Bradley, Jenks and Myers.	Section	10	5372 687	6 7			50 1562	6 15				335 32 283 14
66	Richardson and Thayer, Isaac Harris,	15 ch.	12	14580	8	2780	50	18738 3005 20000	8 22				4896 54 2700 00
67	Castle and Rhey,	Section	80	9054	6½	3084	35	5847	8				2125 67
68	Castle and Rhey,	Section	100	14101	7⅞	6379	49	2780	12½				4630 78½
69	Barclay and Co.	2 ch.	5 75	16775	7½	8080	36	1875	9				4456 24½
70	Barclay and Co.	21 ch.	6	18458	7.6	6596	36	2455	9			Making 100 ps. road at $1.	3844 31
71	Bull and Everett,	Section	25	15118	9	14922	29	126	45			Making 165 ps road at $1 grubb. on slips $105	5939 70
72	Bull and Everett,	Section	50	7000	9	6900	29	1746	10			Making 111 ps. road & grubbing on slip $129 25	2973 85
73	Olcott and Co. Bull and Co.	15 ch.	4	8046 30926	8 6	108 15940	50 45	432 12877	11 9	12 1623	46 43		410 60 10840 38
74	Donaldson and Co.	Section	80	10330	6¾	3504	37½	1038	9	101	45		2065 99½
75	Bull and Everett, Joseph Alexander,			11212	8			1013 4940	10 10			Puddling 66 yds at 20 cts.	1088 26 494 00
76	Riley and Cassady,	Section	61	20064	7⅛	13404	52	30	12½				8539 63
77	Riley and Cassady,			11627	8	262	45	2304	12½			Moving house and stable $15.	1376 06
78	Abner Polly,	Section	100	6601	7			2947	10				886 77
79	Peter Collins,	Section	85	15308	7	93	37½	1841	9			Grubbing additional breadth $8.	1268 52½
80	Bull and Everett,	Section	40	17728	7			627	10				1343 66
81	J. B. & D. K. Cahoon,	Section	25	12788	6¼	15	50	37926 4760	10 12½				5219 55
82	Rossetter and Seely,	15 ch.	1	18500	6	4	30					Grubbing on long slope $50.	1176 20
83	Bradley and Co.	Section	73	15854	6¼	4	37½	1277	7				1154 76½
84	Bradley and Co.			9274	5.9			218	6			Grubbing 1 stump 75 cts.	560 99½
85	Bradley and Co.	Section	10	6238	5.8			305	6				402 10
86	David Leech,			7869	5.8			2501	10.9				725 55
87	David Leech,			6617	5.9	2	40	474	10.9			Grubbing 7 stumps $8.	450 86½
88	Castle and Co.			19459	6¼								1928 68½
89	William Bradley,			12241	7			1319	7			Grubbing 5 chains at $5	902 50
90	M'Nevin and Co. Chipman and Case,	Section	20	2410 8948	7 12½	6 362	33 40	901 3621	8 10			Moving fence $10. Grubbing caused by altering line $15.	270 76 1630 40
91	David Leech,	Section	95	8884	5.8	680	50	5118	10.9				1498 13
92	David Leech,	Section	20	7904	5.8			850	8.9				854 08
				1199477½		270031		471997		24892½			8257519 36¾

Aqueducts	ice.	MISCELLANEOUS.	Total.
Buffaloe creek		Puddling 148 yds. at 20 cts. timber, 1512, at 7 c. plank, 2016, at $30, sheet piling, 1176 at 2½ cts. railing on wings, 64 feet at 75 cents; painting, 121 52½; caulking and pitching 31 45; iron for t. p. bridge, 450 lbs. at 10 cents,	12,283 99½
Bull creek	14	Puddling 148 yds. at 20 cents; timber	
		This culvert is under B. embankment.	66
		392 40 } 319 00 }	711 40
			523 15
		This culvert is under B. embankment.	46 13
		This culvert is under B. embankment.	484 14
			86 35
			553 04
		Removing timber, $13 50.	420 72
			269 79
			518 75
		This is under road.	153 85
		317 66½ } 235 67½ }	553 24
			217 00
			73 50
		This conducts spring under canal.	247 50
		Digging culvert pit, and putting in timber, $324.	324 00
			7408 62½

AQUEDUCTS.

Aqueducts	Names of contractors	Perches masonry.	Price.	Yards. Excavation earth.	Price.	Ft lineal. Trunk.	Price.	Cut stone.	Price.	Yards. Embankment.	Price.	MISCELLANEOUS.	Total.
							Dolls.						
Buffaloe creek	Foster and Bole,	3707	$2	740	$28	240	1260	19390	$15			Puddling 148 yds. at 20 cts. timber, 1512, at 7 c. plank, 2016. at $30, sheet piling, 1 76 at 2½ cts. railing on wings, 4 feet at 7 cents; painting, 121 5-6; caulking and pitching 2145; iron for t. p. bridge, 45 lbs. at 10 cents.	12,283 99½
Bull creek	Orson Shaw,	1787	1 75	1001	30	71	4	7620	15	5958	14	Puddling 148 yds. at 20 cents; timber 1 140, at 7; plank 1140, at 3; sheet piling 147, at 2½; protection wall, 22 perches, at $5 00; iron to secure trunk, 794 lbs. at 10 cents; timber, replaced, 135 feet at 18 cents,	6,139 87
Deer creek	Orsoo Shaw,	1385	1 75	920	30			4654	15	8005	14		3,818 55
"	Isaac Harris,	1415				122							5,700 00
Squaw run	Daniel Washburn,	1639	2	1483	30	60	4	0600	15	14506	14	Puddling 70 yds. at 18 cents; timber 13 9 feet, at 7; plank 1036, at 2½; grubbing, $24 50.	7,147 76
		9933		4144		493		38264		23464			33,090 17½

LOCKS.

Locks.	Names of contractors.	Perches masonry	Price.	Yards. Excavation earth.	Price.	Yards embankment.	Price.	Puddling.	Price.	Sheet piling.	Price.	MISCELLANEOUS.	
No. 1.	Foster & Bole,	1115 9½	396 87 4	3275	10	1700	12	400	20	3	6	900 bu. water lime. at 20 cents,	4815 17
2,	John Moore,	750	3 87½	1427	12	1350	15	350	30	4	6	510 do do	3510 99
3 & 4,	Beecher, Jones & co.	1491	3 65	2796	12	2830	12	700	20	8	6	2225 do do	6750 27
5,	Richardson & Thayer,	900	3 73	1917	10	1536	12	440	20	4	6	700 do do	5987 42
"	Isaac Harris,	25											100 00
		4288½		9413		7436		1890					19163 86

LOCK-HOUSES.

Lock-houses at Lock No. 1,	Spencer & Hagerty,	Houses complete,	$320
2,	do do	do	294
3 & 4,	do do	do	294
5,	do do	do	294
			1176

CULVERTS.

Culverts.	Contractors.	Perches masonry	Price.	Yards Excavation	Price.	Plank.	Price.	Timber	Price.	Yards puddling.	Price.	Sheet piling.	Price.	MISCELLANEOUS.	
Section at aqueduct.	Le Baron & Lothrop,	401	3 00												1203 00
No. 12	Polly & Barclay,	131	2 00	240	38										393 20
16,	Samuel . Richards,	134	1 75	690	13.7	700	2 68	1251	7	156	18	3	1 33½		469 19
23	Robert Braden,	55	2 00	661	12½	300	1 60	683	5						234 77
32	Robert Boyd,	33	2 00					1108	3					This culvert is under B. embankment.	66
37	Richardson & Thayer,	150	1 75	537	18									392 40	711 40
"	Philo Ingerson,	116	2 75	5										319 00	
38	Bull & Everitt,	197	2 00	318	20								1 83½		525 15
				529	12										
40		56	75	59	7									This culvert is under B. embankment.	46 13
48	John Keen,	144½	2 50	154	10									This culvert is under B. embankment.	484 14
				116	7	502	2 50	1240	7						
49	do	55	1 25			309	2 00	160	7						86 35
54	Richardson & Thayer,	174	1 75	572	10										558 04
				183	7¼	864	2 50	1780	8	176	8			Removing timber, $13 50.	420 72
57	Barclay & Kennedy,	152	1 75	599	7	560	2 50	1320	7						
				37	9	125	2 81								
60	Richardson & Thayer,	95	1 75	138	12½	730	2 50	972	7						269 79
64	Castle & Riley,	1 5	1 75	801	du					47	20				518 5
69	Lemuel Castle,	78	1 70	170	do									This is under road.	153 85
73	Olcot & co.	173	1 62½							203	18			317 66¾	515 24
"	Bull & co.	139½	1 49							154	18			235 67¼	
75	Bull & Everitt,	108	1 75	110	12½							2	2 00		217 00
				350	2½										
80	do	82	2 25	10	15										73 50
91	Wilson & Taylor,	140	1 75							20	12½			This conducts spring under canal.	247 50
"	David Leech,													Digging culvert pit, and putting in timber, $324.	324 00
		3000		5812						756					7408 62½

MENTS.

Bridges on sections.	Name	rice.		
No. 2,	M'Fa	12½		$50 00
4		do		163 87½
5	Bales	11		135 41
6	M'Fa	14	Removing cider press and grubbing in orchard, $10.	213 70
17				30 25
21		11		21 00
23		12		18 12
25	Carso	12½		64 25
27	M'Fa	do		93 12½
29		do		
31				
33				
37				
38				
40				
46				
48				
49				$72 75
52				73 50
54				
56				294 75
59				
61				296 25
64				201 75
6				86 25
6				368 00
				66 87½
				19 00
	t Bull			
	aqueduc			
	On section		For calking aqueduct 3 40	21 90
	At culver			10 00
	Sec. 54 &			
				414 61
	At aqued			90 62½
	Deer cree			
	Rev. R. W			135 00
	house,			
	On Sec. No.			291 00
	81, 82,			
	At aqueduc			103 00
	Deer creek			
				30 00
				2575 26

BRIDGES.

Bridges on sections.	Names of contractors.	Finished.	Price.
No. 2,	M'Farland & Cahoon,	done	$137
4	do	done	137
5	Bales & Co.	done	187
6	M'Farland & Cahoon,	done	150
17	do	done	137
21	do	done	137
23	do	done	137
25	Carson and Clark,	done	135
27	M'Farland & Cahoon,	done	137
29	do	done	137
31	do	done	137
33	do	done	137
37	do	done	137
38	do	done	137
40	do	done	137
46	do	done	137
48	do	done	137
49	do	done	137
52	do	done	137
54	do	done	137
56	do	done	137
59	do	done	137
61	do	done	137
64	do	done	137
65	do	done	137
67	do	done	112
73	do	done	112
74	Bales & Co.	done	150
75	James White,	done	150
77	do	done	150
79	Robert Beatty.	done	137
80	David Leech,	done	135
83	do	done	135
86	do	done	135
88	do	done	135
89	do	done	135
91	do	done	135
On sections 85 & 86, across ravines.	William Lapsley,	done	260

BRIDGE EMBANKMENTS.

Bridge embankment.	Names of contractors.	Yds embankm't	Price.		
On section No. 2,	Gallagher and Patrick,	400	12½		$50 00
2	John Shulas,	1351	do		168 87½
4	M'Farland & Laverty,	1231	11		135 41
17	John Karnes,	1435	14	Removing cider press and grubbing in orchard, $10.	213 70
21	Michael M'Dermott,	275	11		30 25
23	do	200	10		21 00
	Barnabas Levering,	145	12½		18 12
25	Carson and Clarke,	402	do		64 25
27	Jacob Pratt,	185	do		23 12½
29	Jos. Morrison,	313	12		37 56
32	Robert Boyd,	729	12		87 48
33	George Trucks,	473	12½		59 39½
		57	10		
37	David Boyd,	1450	10	Making culvert $4, grubbing $5.	154 60
38	do	330	11		41 80
40	John Shields,	928	9		83 52
46	David Boyd,	1100	11	Removing timber $5.	126
48	N. West & Co.	1330	12		159 60
49	John Keen,	6304	12½	Excavation 160 yards, at 7 cents, stone work, 55 per. at $1 25; plank 320 ft. at $2.	874 35
52	George Trucks,	569	12½		77 92½
		68	10		
54	George Romaly,	1040	12½		130
56	John Pillar,	101	12		12 12
59	George W. Martin,	1748	12½		218 50
61	Robert Dunseth,	481	10		48 10
64	James Thompson,	1220	12½		152 50
65	do	311	11		34 21
67	Lemuel Castle,	1823	10		182 30
74	Jos. Alexander,	365	20	6 perches road, $1 50.	70
75	Aaron Fitzgerald,	2787	11		306 57
77	Michael M'Dermott,	500	10		50
79	Alexander Patterson,	250	12½		31 25
80	Henry Stroud,	400	11		44
83	B. Curry,	2052	10		205 20
86	John Miller,	547	11		60 87
89	John Miller,	71	11		7 81
		33887			3975 62½

WASTE-WIERS.

Waste wiers.	Names of contractors.	Perches masonry	Price.	Sup. yds. pavement.	Price	Feet timber.	Price.	3 inch plank.	Price.	2 inch plank.	Price.	Yards excav'n.	Price.	Yards puddl'g	Price.	lbs. iron.	Price.	Amount.
					Cts.													
On sect. 7	Martin and Love,	15½	$4 50	478	60	245	7	542	3½	496	2½	242	12½	19	18	108	12½	453 36½
24	Spencer and Clarke,	15½	4 50	398	60	245	7	542	3½	500	2½	283	do	39	18	108	do	403 69
28	Martin and Love,	15½	4 50	328	60	245	7	551	3½	500	2½	810	do	27	18	108	do	436 22
37	Jenks and Myers,	15½	6 00	129	125	245	6¼	242	3	500	2	209	do	19	18	108	10	328 66½
58	do	15½	6 00	142	125	245	6¼	242	3	500	2	524	do	19	18	108	10	384 29½
78	Sacket and Smith,	15½	6 00	101	96	245	6¼	242	3	500	2	270	do	19	18	108	10	272 00½
89	do	15½	6 00	325	96	245	6¼	240	3	1751	2	500	do			108	10	746 88½
																embank.		
		110½		1901								2338		142		1397		$3025 12

Tumbling Dams.

On section 46, Jenks and Myers,	contractors, 170 sup. yds. pavement at $1 25; 50 feet timber at 6¼ cents; 800 sheet piling at 2 cts. 304 yards excavation at 12½ cents; 15 yards puddling at 18 cents; grubbing, $7,	269 32½
Section 68, Sacket and Smith,	contractors, 114¼ yards pavement; at 96 cents; 65 feet timber at 6¼; 260 sheet piling at 2; 2 70 yards excavation at 12½; 19 yards puddling at 18,	156 35¼
		$425 67¾

Fence.

Dixon and Karns,	2810 perches, at	74 cts,	$2079 40
Joseph Crawford,	387	74	286 38
John Speer,	200	75	150 00
John Keen,	840	75	630 00
Henry Killett,	65	75	48 75
John Parry,	1016 / 87	70	776 45
David Leech,	1100	75	825 00
Robert Beatty,	200	75	150 00
	6705		$4945 98

WALLS ON SECTIONS.

Walls on Sections.	Names of Contractors.	Perches Masonry.	Price.	Yards excavation of earth	Price.	Sheetpiling.	Price.		
No. 1	Gallagher & Patrick,	97	75						$72 75
	Spencer & Clark,	98	75						73 50
At bridge on Sec. No. 4	Carson & Clark,	196½	1 50						294 75
At Buffaloe creek aqueduct,	James Bole,	395	75						296 25
On section 10	Samuel Lonergan,	807	25						201 75
13	Abner Polly,	115	75						86 25
17	John Kearnes,	736	50						368 00
16	Alexander Riddle,	53½	1 25						66 87½
32	Robert Boyd,	19	1 00						19 00
At Bull creek aqueduct,	Jacob Horton,	yds 22	75					For calking aqueduct 3 40	21 90
On section 38	Bull & Everett	per. 40	25						10 00
At culvert on Sec. 54 & 57	Horace Woodworth,	210							414 61
68	do do	43	2 00	25	12½	100 feet	1 50		90 62½
At aqueduct Deer creek.	do do	90	1 50						135 00
Rev. R. Woods house,	Norman Sackett,	194	1 50						291 00
On Sec. No. 80, 81, 82,	William Ramsey,	103	1 00						103 00
At aqueduct Deer creek,	Jinks & Myers,	40	75						30 00
		3259		25 yards.					$2575 98

	1,890
	756
	142
ns	34
Puddling"	1,332
	4,510
10th November, 1827,	

ddling, included in statement of sections.

n sections	$ 259,510 36¾
aqueducts	33,790 17½
locks	19,163 85
lock-houses	1176 00
culverts	7,408 62½
bridges	5,417 00
bridge embankments	3,975 62½
wastewiers	3,025 12
tumbling dams	425 67¾
fence	4,945 98
walls	2,575 26
foundation of bridges	86 63
safety gates	420 00
road	1,492 16
repairing sections	3,245 02½
drains	287 70
puddling not included in sections	262 16
hill-slips	26,764 70
miscellaneous work	745 74½
	$ 372,107 80½

ember, 1827,	334,795 01	
legheny aqueduct to 10th		
in this statement,	59,000 00	
		275,795 01
th November, 1827,		96,221 79

atement of work done on the Allegheny line of the ania canal, from the commencement of the work, ember, 1827, to this date.

under the head of "hill-slips," is but a small part the slipping of the hill. It shews the amount of ne under contracts subsequent to the original con-

f Kiskeminetas having been attached to the Kiske- f the last report, the amount of work done there above.

Respectfully yours,

JAMES D. HARRIS, *Engineer.*

ROAD ON SECTIONS.

Road on sections.	Contractors.	Perches of road.	Price.	Excavation.	Price.		Amount.
No. 41 to 46	Daley and Barrett,	327	1 50				490 50
44	Stewart and Keen,	21	1				21
43 to 48	James Olcott,	339	1				339
68	Allen Eddy,	30	1				30
69, 70	Barckley & Co.	100	1				100
69 to 72	Philip Kennedy,	204	1 50				3 6
81	Wm. Ramsey,			930	6		55 80
83	John Miller,			292	8		23 36
62, 63 & 64	James Thompson,	160	25				40
17	John Kearnes,					Making a small bridge, $10 00	10
60	Geo. W. Martin,					do do 40 00	40
73	Norman Sacket,					do do 36 50	36 50
				1222			$1492 16

EXCAVATION OF FOUNDATION OF BRIDGES.

Excavation of foundation of bridges	Contractors.	Yards excavation		
No. 20, 23, 25, & 27.	Thomas Lardin,	140	14	
No. 33, 54 59 & 61.	Eli Davis,	109	7	7 63
No. 86, 88, 89 & 91.	David Leech,	650	65	
		899		$86 63

SAFETY GATES.

Safety gate on Sections.	Contractors.	Price.	Number of gates,	
No. 1 & 7	Benjamin King,	$70	1	70
2 54	Jenks & Myers,	70	2	140
1 66	do. do.	70	1	70
2 81	Wm. Dilworth,	70	2	140
				$420

REPAIRING SECTIONS.

No. of sections.	Contractors.	Excavation of earth.	Price.	Embankment.	Price.	Amount
		yards		yards		
No. 3 & 4	William M'Cune,	60	10	61		6 00
17	John Kearnes,				12½	828 62½
20	Charles Kearnes,	660	10	6629	10	181 00
22	James Cain,	200	10	1150		20 00
28 & 29	James Hare,	167	10		10	430 40
48, 49 & 50	Jos. and Sam'l Morrison,	3967	10	4137	10	595 50
81	William Ramsey,	7223	9	1988		650 97
88 & 89	Edward Riley,					118 97
56 & 57	Philip Kennedy,	2518	10			251 80
59	James Speer,	463	10			46 30
36	Jos. Taylor,			598	10	59 80
35	John Moore,	446				44 60
Bridge on sect. 91,	James Miller,					11 06
		15704				$245 02½

DRAINS.

On section 22,	Michael M'Dermitt,	462 yds. excavation, at 20 c,		$92 40
23 & 24,	James Gallagher,	1026	15	153 90
51.	Nathan Waldo,	234	10	23 40
81.	Henry Stroud,	180	10	18 00
				287 70

PUDDLING.

On section 16,	Alexander Riddle	1000 yards, at 20 cents,		$200 00
25.	Hugh Carson,	212	18	38 16
38,	Bull and Everett,	120	20	24 00
		1332		262 16

HILL-SLIPS.

Hill slips. Sections.	Names of Contractors.	Excavation of earth.	Price.	Excavation of earth	Price.	Embankment.	Price.	Perches Wall.	Price.	Puddling.	Price.		
				Yards.		Yards				Yards.			
No. 9	Nicholas West,	6635	10	3717	50	6500	12	1400	30	850	18	Grubbing on slip $15.	3835 00
10	Samuel R. Richards,	3848	12½	2075	50			807	25			Grubbing on slip $10.	1730 25
11	Samuel Everitt,	6415	10	4087	50			2580	25			Grubbing $7.	3857
12	Polly & Kennedy,	960	12½	6447	50	400	12½	4551	25	133	18	Grubbing on hill $10.	457 19
13	Abner Polly,	1149	9	973	50	822	10						523 11
25	Hugh Carson,	775	8	186	50							Grubbing $25 60.	150 60
26	Robert Dull,	5745	12½	387	40	250	10						269 17
42	George W. Trout,	8582	9	5177	45								2290 12
42	Jos. & Sam. Morrison,	5527	9	1843	45							Grubbing $12.	1338 78
43 to 48	Daley & Barret,	10500	12½	1180	50	7000	10			512	20	Grubbing $39.	2091 40
67 68	James Hare,	1464	12½	221	40	2124	8						441 52
69, 70	Philip Kennedy,	8715	9	2849	50								2208 85
71, 72	Samuel Everitt,	8987	9	3173	50	3060	11	425	25				2833 84
90	John Miller,	3083	14	261	48	750	10						624 07
		67302		30276		30912		9743		1495			$26764 70½

MISCELLANEOUS.

Removing and underpinning stable, on section 4,	Carson and Clark,	contractors, 16½ perches wall at $1 50, removing stable, $55,	79 37½
Water-line furnished,	John Keen,	do 1827 bushels water lime, 870 at 20 cents, and 957 at 25 cents,	413 25
Clearing basin on section 53,	Alexander Stewart,	do amount for chopping, grubbing and clearing $42 12,	42 12
Railing on wings of aqueduct,	James Milligan,	do amount for job, $132,	132 00
Painting bridges, on sec. 17, 49, 45 and 88,	John Keen,	3 at 15 and 2 at $17,	79 00
			$745 74½

RECAPITULATION OF THE ALLEGHENY LINE.

	Cubic yards.	
Excavation of earth in sections	1,109,477½	
do at aqueducts	4,144	
do at locks	9,413	
do at culverts	5,512	
do at wastewiers	2,838	
do at tumbling dams	374	
do at foundation of bridges	899	
do in road not estimated by the perch.	1222	
do at repairing sections	15,704	
do in drains	1,902	
do in hillslips	67,336	
	1,219,841½	
Deduct amount done to 10th Nov. 1827	1,066,467½	
Amount done since	152,874	
Excavation of rock in sections	270,031	
do in hillslips	30,276	
	300,307	
Deduct amount done to 10th Nov. 1827	238,508	
Amount done since	61,799	
Embankment in sections	471,997	
do at aqueducts	23,464	
do at locks	7,436	
do at bridge embankments	32,887	
do at repairing sections	15,502	
do at hillslips	20,912	
	572,498	
Deduct amount done to 10th Nov. 1827	396,405	
Amount done since	175,793	
Masonry at aqueducts	9,953 perches	
do at locks	4,888½	
do at culverts	3,000	
do at wastewiers	110¼	
	17,331¼	
Amount done to 10th Nov. 1827	20,305	
Deduct amount done at Allegheny aqueduct to 10th November, 1827, not included in this estimate,	3,500	
	16,805	
Amount done since	526½	
Protection wall and pavement in sections	24,423½ perches.	
do in wastewiers	1,901	
do in tumbling dams	284½	
do in statement of wall	3259	
do at hillslips	9,743	
	39,610	

Dedubt amount done to 10th November, 1827,	18,449½	
Amount done since	21,160½	
	Cubic yards.	
Puddling at aqueduct	366	
do at lock	1,890	
do at culverts	756	
do at wastewiers	142	
do at tumbling dams	34	
do under head of "Puddling"	1,532	
Puddling all done since 10th November, 1827,	4,510	

This is exclusive of puddling, included in statement of sections.

Amount of work done upon sections		$ 259,510 36½
do at aqueducts		33,190 17½
do at locks		19,163 85
do at lock-houses		1170 00
do at culverts		7,408 62½
do at bridges		5,417 00
do at bridge embankments		3,975 62½
do at wastewiers		3,925 12
do at tumbling dams		425 67½
do at fence		1,945 98
do at walls		2,575 26
do at foundation of bridges		86 63
do at safety gates		420 00
do at road		1,492 16
do at repairing sections		3,245 02½
do at drains		287 70
do at puddling not included in sections		262 16
do at hill-slips		26,764 70
do at miscellaneous work		745 74½
		$ 372,107 80½
Amount done to 10th November, 1827,	$34,795 01	
Deduct amount done to Allegheny aqueduct to 10th Nov 1827, not included in this statement,	59,000 00	
	275,795 01	
Amount done since 10th November, 1827,	96,221 79	

The foregoing is a true statement of work done on the Allegheny line of the western division, Pennsylvania canal, from the commencement of the work, and also from the 10th November, 1827, to this date.

The work stated as done under the head of "hill-slips," is but a small part of what was occasioned by the slipping of the hill. It shews the amount of that description of work done under contracts subsequent to the original contracts for the sections.

The aqueduct at mouth of Kiskeminetas having been attached to the Kiskeminetas line since the date of the last report, the amount of work done there at that date, is deducted as above.

Respectfully yours,
JAMES D. HARRIS, *Engineer.*

ABNER LACOCK, Esq.
Acting Commissioner.
30th November, 1828

e, Western Division, Pennsylvania Canal, from Section t Pittsburg, and the work in city of Pittsburg.

ce.	Yards embankment.	Price	MISCELLANEOUS.	Amount.
Wal	6030	7.9		$ 563 57
	4485	9		603 37
	15028½	10		1976 05
	21290	15		3421 50
5	63000	16		12365 50
	10000			

Yards mbankment.	Price:	Wall.	Price.	Amount.
6730	10	2250	20	3845 43
725	10			419 81
				5499 50
8456	10			2482 97
16547	10	610	25	4359 44
3242	12½			2483 70
				473 50
3890	10			838 87½
5313	10			1396 30
44,703		2860		$21,799 52½

Price.		Amount.
		333
		411 75
8	Excavation of rock in road, 48 yards at 37½	322 10
6		151 50
		180
		338 40
		117
		470 75
		66 25
		$2390 75

WALLS.

Walls on sections.	Names of Contractors.	Perches of masonry.	Price.	Yards excavation of earth.	Price.	Yards Puddling.	Price	Yds. em. bankment.	Price.		Amount.
No. 98	Wilson Crawford,	308 75	62½								192 97
101	Eddy & Johnston,	284	25								71
104	Enoch Jones,	16 33	1 00								1635
At culverts,	Jeffery & Love,	137 50	2 00	60	10						261
At lock No. 7 & 8 on sec. 111	Sanger & Fleming,	933	1 75			80	25			Coping 1242 feet at 20 cents,	1962 75
At pier head No. 113,	Provost & Byrne,	651	2 25					2000	12½		1669 75
											$5792 47

TUNNEL, &c.

Malloy, M'Avey & Co. contractors, 33.61 perches of work done, 61,000, $33,600 00

AQUEDUCTS.

Pine creek, Washburn & Bronson contractors, 4478 perches of masonry $294, 2445 yds. of excavation 35½, 452 puddling 20 cts. 120 feet lenacl trunk $7, piling done 620, sheet piling for foundation 40 '5, 800 feet sheet piling at ends of trunks 5 00, talking trunk 38 00, extra railing, &c. 33 37½. 15,719 82

Allegheny river at Pittsburgh, Le Baron & Lothrop contractors, 7/8 perches of masonry; of work done 100,000 55,000 00

MISCELLANEOUS.

Embankment adjoining lock No. 6 Sec. 93, Miller & Patterson contractors, 3778 yds. embankment, 18 cts. 680 04
Drains on Sec. 93, do do do 2396 do do 10 4154 yards excavation 8 cents, 350 32
Breech on 96, Nathan Waldo contractor, 1352 perches of masonry 20 cents, 270 40
Fence 109, Jacob Cups, do 22 rods fence 87½ 19 25
Fence around lock No. 7, Sanger & Fleming, contractors, 37
Excavation and embankment around lock No. 7, Sanger & Fleming, 2660 perches of masonry 14 cts. 2700 yds excavation 10 cts. 643 40
Painting 2 bridges on section 104, 109, F. Kane, 24 50 each, 49
1 do do 103, do 24 30 24 80
Safety gates on sections 96, 97 & 109, Dilworth, 4 safety gates 70, 280
Water Lame, John Kane, for aqueducts, culverts, &c. 256 bushels 24 cents, 62 39
$3406 42

BRIDGES.

Bridges on Sections.	Contractors	Perches of Masonry.	Price.		Wood Work.	Price.	Miscellaneous	Amount.
No. 98 and 103	Crawford & Everett,	8		2 wooden bridges, at $ 150 each	8		Extra work, widening one bridge, $29	329
104	Enoch Jones,			1 do do 150 do			Extra do do do 36 85	186 85
111, 113 and 107	J. & B. Vandegrift,			3 do do 150 do				450
109	do			1 do do 150 do				150
112	Black & Charters,	504	2 96		done	132	Extra work for footway, &c. 99 86	1,846 76
Penn street,	do	249	3 10		done	152	Extra do do 125 02	
Liberty street, Across road on 104	Coltart & Dilworth, John Scott,	358	3 10		done	152	Stone furnished and quarried, 163 69 / Extra work for footways, &c. 139 89	1,211 61 / 1,401 09
Temporary bridge on 104	Enoch Jones,			1 wooden bridge, at $ 35				33
do. 113	Wm. Robinson,			1 do do at 12				12
				1 do do at 25				25
		1171						$5,048 95

ROADS.

Roads on Sections.	Contractors	Rods of Road	Price	Miscellaneous,	Amount.
No. 97 and 98	Wilson, Crawford & Co	23	$5,00		125
99	James McCain,	24	84	Grubbing $100	184
100	Edward Riley,			do 54	130
	J. & L. Wynn,	30		And making 2 culverts, $130,	130
101	Eddy & Johnston,	60	5,00	Grubbing $100, Road $36,	310
103	James Lonergan,			do 84 Rods $100, 11,124 yds earth, at 8 cts per yd. 4,020 yds rock at 50	3,464 92
106	Matthew Murdock,			Repairing road, 86,	6
108	Black & Snodgrass,			Amount $48,	48
					$4,297 92

WASTE WIERS.

On Section 103, Sacket & Smith, contractors, perches cut stone, 151, at $6, pavement 161 at 96 cts. paddling 250 at 18¾ square timber 235 at 6¼ plank 3 inch. 266 at $3, 2 inch. 300 $2, iron 108, 10 cts. spur wall, perches 50, 40, at $1,50, 415 10

RECAPITULATION

Of the amount of work done on Pine creek line, Western Division, Pennsylvania canal.

Amount of work done on sections,			$ 73,412 49½	Amount of work done at bridges,	5,648 92
do	do	do at locks,	33,299 99	do do do at roads,	4,297 90
do	do	do at culverts,	9,894 59½	do do do at waste wiers,	410 15
do	do	do at pier head, Harbour basin, &c	21,081 77½	Miscellaneous work, amounting to	3,405 41
do	do	do at slips,	21,799 52½		
do	do	do at bridge embankments,	2,990 75		
do	do	do at fence,	730	Deduct amount done to the 20th Nov, 1827,	$ 83,816 72
do	do	do at walls,	5,792 47		77,373 36
do	do	do at tunnel, &c	133,600		
do	do	do at aqueducts,	70,719 82		206,443 36

STATEMENT of the amount of labour done upon the Pine Creek Line, Western Division, Pennsylvania Canal, from Section No. 92 to 113, inclusive, also the Aqueduct over the Allegheny, at Pittsburg, and the work in the city of Pittsburg.

No of Sections	Names of Contractors.	Grubbing	Price.	Excavat'n of earth.	Price.	Excavat'n of rock.	Price.	Yds em. bankment.	Pre	MISCELLANEOUS.	Amount.
				Yds.							
93	Samuel Bickey,			1478	5 9			6030	7 9		$ 565 57
94	Lewis and Blakely,	Section	$ 10	3162	6			4485	9		608 37
95	Miller and Patterson,	do	97 50	2787	3			150984	10		1976 05
96	John Crandal,	do	200	350	8			21990	15		3421 50
97	Washburn, Bronson & Co.	do	100	13900	12	1130	45	63000	16		13566 90
98	Wilson Crawford,	do	100	30949	10	2241	50	10232	10		5335 60
99	James M'Cain,	do	100	10795	7	605	49	6218	7 9		1643 30
100	Riley and Cassady,	do	100	11150	8	914	50	5015	8		1688 60
101	Castle and Co.	do	100	9199	8	1403	35	1486	8 6		1412 98
102	William Bradley,			5858		1085	37½	7604	6		1213 84½
103	Patrick Cassady,			6900	8	1573	37½	22532	14		4399 154
104	Jackson and Gebby,			4160	6½	409	38	3604	7		698 15
104	Enoch Jones,			59244	12	9977	50	54350	13		19332 78
105	Riley and Cassady,	Section	13	10185	8	881	50	7537	7		1793 89
106	Barnes and Black,	do	40	12184	6	53	37½	600	7		1074 18
107	William Bradley,	do	20	11425	6	538	35	3319	6		1004 18
108	Barnes and Black,	do	50	18108	6	114	37½	12506	7		2054 65
109	Cooper & David Barckley,	do	13	29584	6	952	37	23875	7		5917 90½
109	John Barkley and Co.			26547	10	537	45	21446	10		4930 91
110	Flood and M'Lean,	Section	20	14754	5			11792	9½	Puddling 495 yds. at 20 cts.	1923 76
110	Fenix Curran,			30854	10			26618	10		5697 20
111	William Robinson,			3430	7			2018	9		411 72
112	William Robinson,			6662	7			2063	9		653 81
113	William Robinson,			2670	7			1367	9		370 93
				302,535		22410		315904			73412 49½

LOCKS.

No. of Locks.	Names of Contractors	Excavat'n of earth	Price.	Perches of Masonry.	Price.	Yrds of Puddlin	Price.	Embank-ment.	Price.	Water Lme.	Price.	Sheet piling.	Price.	Amount.
		Yards.						Yards.		Bushels.		Feet		
6	Nicholas West.	1805	9	776 20	4 63	749	37½	2544	12	757	25	705	25 per M.	4554 41
7	Sanger & Flemming.	4475	8	966	4 87½	501	25	1000	12	960	20	960	20 per M.	5727 79
						516	50	1438	36	960	10	960	10 per M. spikes 30a 10c.	
8	Cahoon & M'Farland,	1523	10	970	4 50	257	16	2538	50	715	25	698	25 per M.	5749 96
						468	50							
9	Provost & Byrne,	5667	9	1038,40	4 70	900	16	1954	12	1200	25	698	20 per M.	6176 95
10	do do	8930	9	1892	4 70	900	16	4318	12	2870	25	432	35 per M.	11090 88
		20457		5662.60		1061		13812		6037		4453		33999 99

CULVERTS.

On section.	Names of Contractors.	Perches o Masonry.	Price	Excavation of earth.	Price.	Puddling.	Price.	Embank-ment.	Price.		Amount.
				Yds.		Yds.		Yds.			
102	William Bradley,	150	2 25	290	60	61	20			Timber for foundation 2970 a 6cts. plank 11:4 a $30 Ring Stone Lime & centive $58 25,	735 65
	Patrick Cassady,	1202	2 50	309	50						3155 60
104	John Scott,	158	1 70	1014	20						471 40
	Jeffery & Love,	238½	2 50	154	20	76	18				686 10½
106	Barnes & Black,										75
107	Riley & Cahill,	41	2 50			44	16	590	12	2 Culverts across road at $75	179 14
109	Cooper Barckley,	494	2 25	600	15	966	25			Sheet piling 300, at 62	1231 50
	Edward Donnoy,									Cutting stone for culverts 680 at 25,	170
Allsyards-town.	Malloy, M'Avey, &co.	880	1 95	2358	18½			4400	25		3110 75
		21173½		4096		447		4980			2854 52½

PIER HEAD AND HARBOUR, BASIN BETWEEN LOCKS AND WATER JOBS.

Pier Head harbour &c	Names of Contractors	Masonry. Perches.	Price.	Excavat'n of earth.	Price.	Pud-dling.	Price.		Amount.
No. 9 10 Basin between Water job.	Provost & Byrne,	1142	$ 75						
	do do	387.20	3	3205	9	282	18	Excavation of Harbour & foundation $75 75, 486 feet square timber at 10 a 400 feet plank at $35,	11857 50
	do do	done						done	1638 63
									7585 64½
									21081 77½

SLIPS.

Slips on Sections.	Names of Contractors.	Yards excavation of earth	Price.	Yards excavation of rock	Price.	Yards embankment.	Price.	Wall.	Price.	Amount.
No. 99	M'Caine & Co.	6855	10	4157	45	6730	10	2250	20	3848 45
100	J. & L. Wynn,	5109	9	135	50	725	10			419 81
101	Eddy & Johnston,	40716	12½	820	50					5499 30
103	Gebby & Patterson,	14063	9	756	45	8456	10			8482 97
105	James Lonergan,	15361	9	8755	49	16647	10	610	25	4859 44
106	Black & Snodgrass,	16006	12½	6	45	3242	12½			2483 70
106	Matthew Murdock,	3749	12½			3749	12½			473 59
107	William Bradley,	9999	12½			6890	10			838 87½
108	Matthew Murdock,	6920	12½			5315	10			1206 50
		160,577		8631		44,703		2860		$21,799 52½

BRIDGE EMBANKMENT.

Bridge embankments.	Names of Contractors.	Yards embankment.	Price.	Yards, excavation of earth in road.	Price.		Amount.
93	Miller & Patterson,	2664	12½				333
98	Wilson Crawford,	3294	12½				411 75
101 & 102	William Bradley,	1700	12½	1145	8	Excavation of rock in road, 43 yards at 37½	322 10
107	Do Do	1515	10				151 50
109	Cooper Barclay,	1434	10	610	6		159
	John M'Cauland,	3384	10				470 75
111	William Robinson,	936	12½				338 40
112	William Robinson,	3766	12½				117
113	William Robinson,	592	12½				66 25
		19285		1755			$2990 75

FENCE. J. & B. Vandegrift, 900 rods of fence at 80 cents, $720.

STATEMENT of th, Pennsylvania canal, from the
e.

No. of section.	Names of co	Price.		Total.
1	Le Baron and Lot	12	completed	$ 4333 07
2	W. W. and J H	12	completed	4680 24
3	George D. Forem	10	completed	3788 43
4	James Andrews	8	completed	2596 54
5	J. and R. Dodds		completed	3226 69
6	Dobbin, Percers	11	completed	12226 90
7	Brown and M'Lau		completed	6550 88
8	[illegible]s Boner	6½	completed	469 04½
9	[illegible] and [illegible]	8	forfeited	518 92
10	[illegible]ton	12	completed	272 01
11	[illegible], Peacoc		completed	2783 84
12	[illegible]	11	completed	26[illegible]5 69½
13	[illegible] d Duffy		completed	6530 65½
14	[illegible], Morrisor	6	completed	2101 96
15	[illegible] and Bills	10	nearly completed	2180 76
16	[illegible]looper and	10	nearly completed	1010 80
17	do	9	nearly completed	1044 83
18	do	9	nearly completed	659 30
19	do	9	completed	1426 99
	do	9	completed	1714 75
20	do	9	nearly completed	10[illegible]9 45
21	do	9	completed	865 10
22	do	7	forfeited	1076 76
23	. M'Laughlin	14	completed	819 76
	Hickenlooper and	7	forfeited	424 66
	P. M'Laughlin	14	completed	540 24
	Hickenlooper and	8	completed	1392 66
	Hickenlooper and	10	completed	1441 40
	Boyle and Wilson	9	completed	859 00
	do	9	completed	1392 42
	do	6.3	completed	677 60
	do	6.3	completed	642 05
				29,988 85

STATEMENT of the amount of labor done on the Kiskeminetas line, Western Division, Pennsylvania canal, from the commencement to the 25th day of November, A. D. 1828, inclusive.

No. of section.	Names of contractors.	Grubbing.	Price.	Yards excavation of earth	Price.	Yards excavation of rock.	Price.	Yards embankment	Price.		Total.
			D. C.		Cts.						
1	Le Baron and Lothrop,	completed,	2 0 00	19650	9	3085	54	8136	12	completed	$ 4338 07
2	W. W. and J. H. Jones,	do	200	11 36.51	9	6998	45	2365.5	12	completed	4680 24
3	George D. Foreman,	do	170	10836	8	5733	45	1717	10	completed	3788 43
4	James Andrews	do	100	13236	7	3314	35	5109	8	completed	2516 54
5	J. and R. Dodds	do	100	16111	7	4545	44			completed	3226 69
6	Dobbin, Percers and Sackett	do	105	13260	8	28 47	38	2284	11	completed	12336 90
7	Brown and M'Laughlin	do	150	12631	8	17968	30			completed	6530 88
8	M'Closkey and Barr	do	100	10906.28	7	11524	28	851.21	11	completed	4183 79
9	Mahon and Breslin	do	135	7861.89	8	1083	45	9947.21	10	completed	2246 02
10	S. R. and J. Richards and Hill	do	30	8820	7	469	45	4210	9	completed	1437 35
11	do do do	do	60	6844	7	3068	45	450	9	nearly completed	1960 18
12	do do do	do	60	6460.66	7	206	45	5015.52	9	completed	1058 13
13	D. and S. Keisler	do	80	8915	8			9768	11	completed	1867 68
14	Sproull	do	40	7333	7	225	50	15 5	8	completed	801 81
15	M'Farland and Laverty	do	100	27601	7	23781	49			completed	13764 76
16	J. and D. M'Carthy	do	150	11164	7½	1 1 17	37½	916	11	completed	6498 93½
17	Mercer, Smith and Brannen	do	45	9663.21	7	74 2	56	3012.37	9	completed	3657 25
18	Boyd, Bull and Everitt	do	150	9902	8	23271	45	264	9	completed	11437 87
19	Thompson and Waldo	do	52 50	8154	6	794	50	1971	8		1096 42
	S. Jameson (successor)			3458.3	9			872 8	12½	completed	418 54
20	Johnston and Everett	do	150	6081	7			17139	9	nearly completed	2121 18
21	W. B. Lang	do	84	5958.6	6½	195	50	133.4	8	completed	579 47
22	Thomas Neel	do	90	6480	7	166	40	2182	10	nearly completed	8 8 20
23	do	do	50	3645	7			2307	10	nearly completed	675 85
24	Daniel Gilmartin	do	150	5462	8			10641	9	completed	1462 65
25	do	do	100	8991	6	997	37½	3964	7½	completed	1010 06½
26	M. and P. M'Dermott	¾ this done	100	1790	7	1074	30	568	10		691 0
27	Mechlin and Co.	completed	20	1785	8	438	40	5537	10	nearly completed	641 70
28	Peoples, Patterson and Co	do	80	4547	6	1236	40	2859	11	completed	1155 71
29	Philip Hacy	do	75	2440	6	673	50	14071	8	completed	1 43 58
30	Jos. Ralston	do	100	1768	6½			7377	8		797 08
	Callan and John Ralston			7005	8			13693	14	completed	1966 32
30	Peter Duffy	do	80	4662	6	32	40	8014.81	9	completed	1098 65
31	do	do	60	1914.5	8			6338	9	completed	609 47
32	Dickey and M'Farland	do	200	5171.8	6			6065.34	9	completed	856 29
33	Cochran and Duncan	do	100	1 55.1	8			8079.3	10	completed	10 2 31
34	Burke and M'Laughlin	do	90	2134.13	6	894	0	6491.8	11	completed	1269 75
35	Sullivan and Wiley	do	66	5236	8	475	50	7364	9		1280 94
	Culbertson and Kinney			342	6½	200	30	5355	11½	completed	754 04½
36	Curry, Grout and M'Dermott	do	75	2562.12	7	2035	57½	722 27	8½	completed	1077 04
37	M'Crea and Irvin,	do	60	3041.74	6			1308.14	6	completed	324 1
38	do	do	36	14 2.49	6			9341.29	6	completed	38 02
39	Kepple and Culbertson	do	90	369	7	30	40	7162.89	9	completed	772 49
40	do	do	80	1594.51	7	1042	4	3586. 5	11	completed	1044 56
41	Kenny, Moore and Moore	do	90	2088.64	6.8	453	50	9157.1	8	completed	709 48
42	O'Brien, M'Givern and M'De mott,	do	58	2590.14	6½			110.50	7	completed	222 07
43	Stewart, Wallace and Stewart	do	80	3714	8	200	37½	4338.1	7	completed	775 79
44	do	do	78 75	3150	7	1838	36	5957	7	nearly completed	1385 12
45	Windrum and M'Kee	do	60	5200	7	2215	40	8441	10	completed	2134 10
46	J. and C. Merrill	do	150	2657.27	7	5	44	4 93.72	10	completed	70
47	Culbertson, M'Kee and Windrum	do	68	3000	7½	1780	37	3850	8	completed	1258 60
48	M'De mott and Gebby	do	180	3569	7	2296	50	1786	10	completed	17 2 48
49	Henry Nail	do	40	6431	7	20	30	1 12	9	completed	639 25
50	Glenn, Rubin and South	do	200	4447	6½	51	48	1900	8	forfeited	654 41½
	William Kerr	add. grubbing	20	6225	10	600	45	3100	12	nearly completed	1284 50
51	John Moore	completed	90	2183	8	80	30	2240	8	forfeited	453 74
	John M'Glade			887	10	280	50	1948	14	completed	501 42
52	Alexander Sproull	do	150	5721	6½	9	37	150	5	completed	536 76½
53	M'Glade, M'Bride and Co.	do	60	10841	7	6060	30	2792	7	completed	2793 90
54	Milligan, M'Cutchen and Co.	do	126	6569	7	3810	45	2234	8	completed	2559 05
55	John M'Glade and Co.	do	182 25	13346	7	15	50	12959	10	completed	1586 67
56	E. and W. Diver	do	50	6022	6	367	50	1917	6	completed	616 44
57	Manus Boner	do	30	4020	6.8			2549	6½	completed	469 04½
58	Couch, Linn and Couch	do	15	4064	6½			2097	8	forfeited	818 92
	D. Pennington			979	9	75	50	1220	12	completed	272 01
59	M'Mullen, Peacock and Co.	do	80	6798	8	5400	40			completed	2783 84
60	do	do	130	8057	8½	3810	42	1915	11	completed	2 5 3 03
61	Boner and Duffy	do	175	15175	6½	11186	48			completed	6350 65½
62	Pierpont, Morrison and Doyle	do	40	8386	6	5447	40	3010	6	completed	2101 90
63	Thayer and Bills	do	100	7042	8	3226	40	2170	10	nearly completed	2180 76
64	Hickenlooper and Johnston	do	50	930	6	270	50	7700	10	nearly completed	1010 80
65	do do	do	80	1700	6½	512	40	7217	9	nearly completed	1044 83
66	do do	do	50	2700	do			4820	9	nearly completed	639 50
67	do do	do	80	786	do	956	40	101 0	9	completed	1426 99
68	do do	do	80	2832	7	2400	45	3461	9	completed	1714 75
69	do do	do	80	3050	7	1162	50	2055	9	nearly completed	10 9 45
70	do do	do	80	3670	7	880	50	980	9	completed	865 10
71	do do	do	50	3226	7	1162	30	0462	7	forfeited	1076 76
	P. M'Laughlin			800	10	150	50	1 34	14	completed	819 76
72	Hickenlooper and Johnston	do	50	2174	7	393	30	1494	7	forfeited	424 66
	P. M'Laughlin			850	10	206	50	2516	14	completed	540 24
73	Hickenlooper and Johnston	do	75	5958	7	2922	30	325	8	completed	1392 66
74	Hickenlooper and Shields	do	50	2000	8	1989	40	4358	10	completed	1441 40
75	Boyle and Wilson	do	50	7500	7	395	40	1400	9	completed	859 00
76	do	do	50	2946	7	1572	40	5638	9	completed	1392 48
77	do	do	7	857	5	562	31	7199	6 3	completed	677 60
78	do	do	7	458	5	343	51	7049	6.3	completed	642 00
											129,988 85

Price.					Amount.
					1107 45
					1016 20
					335 50
					815 39
12		Slips of towing path;			1454 00
					1137 77
					377 25
					108 00
					509 85
					512 25
					513 00
					1134 70½
					846 72
					45 60
					606 14
					785 96
					789 60
					88 87½
					848 50
					2212 50
				To sustain slip	997 50
					643 50
					934 50
					1285 75
					237 75
					375 00
87.5	40				35 00
					945 00
					30 00
205.6	35				71 95
					88 00
					719 25
					863 80
					913 50
		Excavation of earth.			889 85
534	35				186 90
171	35				59 85
119	35	39	12		46 33
					31889 37

CULVERTS.

No. of Sec. where located	Names of Contractors.	Perches masonry	Price.	Yards excavation	Price.	Excavation of rock	Price.	Yards puddling.	Price.	Yards embankment.	Price.	Miscellaneous.	Amount.
	James Andrews,	94.3	2 50	76.92	12½	68	50	37.2	20				285 30
4	G. & R. Braden,	114.19	2	83	15	115	50					Pavement 2 per. at 75 cts.	298 83
9	Richards & Hill,											Timber 160 ft. 7, plank	612 11
13	George Hutcheson,	317.59	3 50	2550	20			154	25	2858	20	72 feet at 2 cents,	2204 50
20	A. Gaghgan,												136 75
	N. Waldo,												132 50
	George Hutcheson,	145 74	2 50	331	12½			129.21	20			Pav'm't & wall 115 p. 1 50	604 06
	Daniel Gilmartin,	31.59	2	13.84	15							Tim. 184 ft. 6, plk 116 2	78 43
24	P. Haley,	40.36	2 12½	195	10			51	20			Timber 502 ft. at 7 cts.	135 60
28	Henry Null,	77.61	3	235	18	85	50	61	20			Tim. 856 7, plank 520 2	315 18
30	James M'Call,	30	2 50	101	20								95
51	Robert Criswell,	25	3	100	20			50	20				105
	John M'Glede,	50	2 12½	310	20	87	50					Tim. 856 ft. 6, plk 250 4	230 61
53	John Lafferty,	105	2 75					50	26				301 50
	John Chenoweth,	102	3 50	240	12½			180	25	850	20		602
57	Manus Boner,	82.10	2	380	20	120	50	50	29			Tim. 316 ft. 6, plk 234 2	361 64
65	John Fore,												20
	John Johnston,												20
	do do												20
66	do do												20
	do do												20
	do do												20
67	do do												20
67	do do												20
68	do do												20
	John Chenoweth,												20
69	do do												20
	John Johnston,												20
70	John B. Fore,												20
71	do do												25
	John Chenoweth,												20
72	do do												28
													26843 81

LOCKS.

Locks.	Contractors Names.	Perches Masonry.	Price.	Yards Excavation of Earth.	Price.	Yards Excavation of rock.	Price.	Yards Puddling.	Price.	Yards embank'm't	Price.		Amount.
G. L. No. 1	Lafferty & M'Mullen,	1730	4 25	1150	13½			650	25	3300	20	Water cement 3265 b. 2½ cts. 4 rows sheetpiling $10. 4 rows sheetpiling 10, water cement 4550 b. 12½	8803 25
G. L. No. 2	Thayer, Bills & Atkinson,	1731	4 50	3602	16	3133	50	670	25	5660	20	Grubbing lock pit $20,	11925 11
L.	1 Johnston, Wallace & Co.	435	4	2828	15	1718	50	150	25			Water cement 4564 b. at 12½, 4 rows sheet piling $10, and 283 days work pumping water out of lock pit 99 cts. per day,	5989 70
	Brown & Sawyer,	1010	4 50	1745	15	408	50	534	25	4000	20	4 rows of sheet piling $10,	6796 70
	2 Smith & M'Dougal,	924,57	3 98	4979	15½			434	28	1431	20	water cement 3036 b. 12½	5027 29
	3 Leslie & M'Call, Samuel Bobbie,	840	4 50	3066	14	996	50	400	25	1522	20	Grubbing lock pit $30, water cement 2350 b. 12½	5475 39
													1489 33
													42597 68

WATER CEMENT.

John Keen	contractor, 875 bushels at	20,	175
do do	do 679	12½	84 87½
			259 87½

BRIDGES.

Bridges.	Contractors Names.	Wood Work.	Price.	Yards excavation	Price.	Stone work.	Price.		Amount.
1	Spencer & Clarke,	¾	1 35						32 62
	Hugh Carson,	2½	1 02	35	12				72 20
4	do do	¼	1 02	35	12				78
9	Jacob Hill,	¼	1 45						72 50
12	Hugh Carson,	¾	1 50	25	12				105 50
17	David Breneman,	completed	1 40						140
19	Wiley & Co.	¾	1 54						89 35
21	Levi Fray,	completed	1 45						145
49	Brower & Gordon,		1 65			107.66	1 25	Iron work $5	299 57
52	Piper & Blair,		1 45						150
53	do do		1 45						148
56	John Barge,		1 30						65
63	N. Garrett.	¼	75						75
14	Wiley & Co.	completed	1 54						44 66
		¼							1344 38

REPAIRING SECTIONS.

No of Sections.	Contractors Names.	Grubbg.	Price.	Yards excavation of Earth.	Price.	Yards excavation of rock	Price.	Yards Puddling.	Price.	Yards embankments		Miscellaneous.	Amount.
8 & 9	Nicholas Day,												319 00
34	Joseph Ralston,			1096	12½	274	50			346	12½	Pavements 221 square yds. at 35	394 60
36	Robert Criswell,			245	12	61	30			84	14		71 66
43	Smith and Riley,			1182	10					1339	12		278 88
51, 16 & 17	George Hutchinson,			2370	12	420	50	1335	20	500	13		813 60
52	Samuel Martin,												130 65
46	D. M'Kee,			200	10					539	12		86 00
38	Hugh M'Cras,			300	10					147	12½		86 37½
													3315 16½

SLIPS.

Slips.	Contractors Names.	Grub'g	Price.	Yards excavation of earth.	Price.	Yards excavation of rock.	Price.	Yards of embankments.	Price.		Amount.
5	G. D. Forman,		85	4691	10	1365	45				1107 45
4	James Andrews,		50	4364	12½	1202	35				1016 20
4	G. D. Forman,			988	12½	423	50				355 50
3	J. R. Dods,		50	2494	12½	1031	44				815 39
6 & 7	Nicholas Day,			1909	13	1900	50	2300	12	Slips of towing path,	1464 00
8	M'Closker & Barr,			1939	10	1857.74	50				1157 77
17	Osborn & Smith,			8528	12½	5899	50				3677 50
28	Phillip Haley,			999	12	330	5				288 80
59 & 60	Jas. & Jno. Peacock,			2400	12	900	50			Protection wall 300 at 50 cents,	888 00
62	Wm. Morrison,			23735	12	9029	40				6699 80
63	Sherman Bills,			5470	12	3800	50				2936 00
											20711 44

CLEARING AND CHOPPING INUNDATED LAND.

Samuel Everett,	20 acres, 91 perches, at 18 cts.	Robert Park's land,	8370 24
C. Borard,	14 do 55 do at 19 cts.	C. Bovard's land,	272 55
George Hawk,	5 do 30 do at 16 cts.	G. Hawk's land,	63 00
			8705 77

BRIDGE EMBANKMENT.

No. of Sections.	Names of Contractors.	Embankment.	Price.	Amount.
1	James Love,	3417	9	307 53
9	Jacob Hill,	1200	14	168 00
12	D. Keisler,	1600	14	224 00
19	N. Waldo,	656	12½	82 00
19	S. Jameson,	73	12½	9 12½
21	S. Jameson,	709.61		99 34
49	Gordon & Brower,	838	14	117 32
52	Samuel Martin,	1388	10	138 80
53	John M'Glade,	957	13	124 41
63	John Stoops.	776	14	108 64
				1370 16½

DAMS.

No. 1 Leech & Truck, contractors,	1½ $\frac{8}{8}$ 2000 24640 pounds of Iron, at 10 cts. 2000 pounds of oakum, at 12½ cts.	23714 00
2 Thayer & Bills contractors,	¼ 13500, 62173 do do at 10 cts.	13121 70
		36835 70

FILLING IN FOUNDATION OF DAMS.

No. 1 Leech & Trucks contractors,	1500 yards filling breach, at 50 cts	7500 00
2 Thayer & Bills contractors,	5577 yards do at 50 cts.	2688 50
		10188 50

GUARD BANKS.

No. 1 Lafferty & M'Mullen contractors,	3550 yards embankment, at 14 cts.	497 00
1 Joseph Hunter contractor,	1660 yards embankment, at 20 cts.	332 00
Sherman Bills contractor,	4000 yards embankment, at 20 cts.	800 00
		1629 00

WALLS AND PAVEMENT

No. of Sections.	Names of Contractors.	Perches Perp. wall.	Price.	Perches slope wall.	Price.	Yards Puddling.	price.	Yards Pavement	Price.	Ex. of rock below bot. of Canal.	Price.	Miscellaneous.	Amount.
										Yds.			
No. 1	Le Barron & Lothrop	92 66	1			422	18						168 62
2	W. W. & J. H. Jones	349.81	1			1984	18						906 93
6	Dobbin, Powers &co.	818.29	1			3564	20			2399	50		2730 59
7	Brown & M'Laughlin	930	1			4118	20			2671	50		5139 10
8	M'Closkey & Barr	314 67	1			1838.96	20			656.20	50		1011 38
15	M'Farland & Laverty					2543	20						508 60
16	J. & D. M'Carthy					2866	20			2866	50		2006 20
17	Mercer, Smith & co.					753	20			580.51	50		440 75
	G. Hutchinson			912	25								228 00
18	S. & L. Everett	81.97	1										81 97
	Samuel Everett			515	1	2443	20						803 60
23	John Lafferty			267	1 25								333 75
25	Daniel Gilmartin	578.33	1 50										867 49
26	Mecklin & co.		1 50	400	75								277 25
27	Peoples, Patterson & co.	81.50		144	75								108 00
28	Philip Haley	74.40	1 50	331	75								509 85
34	Burke & M'Laughlin			683	75								512 25
35	Wiley & co.			684	75								513 00
	Culbertson & Kennedy			1518	74½								1134 70½
39	Kepple & Culbertson			1138.96	75								846 72
41	Kenney Moore			60.80	75								45 60
43	Smith & Riley			757.66	80								606 14
44	W. Kirkwood			981 28	75								785 96
45	Windrum & M'Kee			987	80								789 60
49	John Cover			79	1 12½								88 87½
62	Peirpoint Munson & co.			1697	50								848 50
63	S. Bills			2950	75								2212 50
	S. Bills			665	1 50							To sustain slip	997 50
64	W. Kirkwood	65	1 50	728	75								643 50
65	John Johnston			1246	75								934 50
66	John Johnston			1568	82								1285 76
67	John Johnston			276	75								207 75
69	John Johnston			500	75								375 00
70	John B. Fore							87.5	40				35 00
71	A. Hickenlooper			1350	70								945 00
	P. M'Laughlin			40	75								30 00
	John Chenoweth							205.6	35				71 95
72	John Chenoweth			100	88								88 00
73	W. Patton			822	87½								719 25
74	Sheilds & Hickenlooper			1234	70								863 80
75	S. Wilson,			1015	90								913 50
76	Boyle, Wilson & co.			1285.3	70					Excavation of earth.			889 85
77	do do do							534	35				186 90
78	O. Boyle							171	35				59 85
74	Asaph Saunders.							119	35	39	12		46 33
													31889 57

nd Conemaugh line, Western Division, Pennsylvania canal;
ection No. 125, above Blairsville.

m-ent.	Price.	Excavation of rock below botton	Price.	MISCELLANEOUS.	Amount,
)	7¾				$532 37½
					555 53½
30	4 20	220	25		4201 60
29	3 93¾	700	25		4589 75
40	3 96	640	25		4154 40
69	4 25	620	25		3766 65
00	4 49	664	25		6496
00	4 44	800	30		5350
					210
				Water lime for locks	3291 70
					38869 71

, at 15 cts. 1231 yards of rock, at 50 cts. 520 yards embankment
dams $100 5059 87½

) cts. 500 yards excavation of rock, at 75 cts. 700 yards embank-
2 Coffer dams at $300 each 985 days bailing water at $1 11342 25

2168½ perches masonry, at $9, 2 Coffer dams at $300 each, 780
21877 50

r yard, 330 yards excavation rock, at 50 cts. 232 yards embank-
$7 96 cts. puddling 110 yards at 25 1908 66
2159 95

42348 23

am 11606

rom 3 to 4 inches, at ½ct, 3000 plank added 3, 7431 lbs. iron 5162 60

16768 60

TOW PATH BRIDGES.

No. of section, where located.	Contractors Names.	Perches Masonry.	Price.	Yards excavation of earth.	Price.	Yards excavation of rock.	Price	Wood work	Price	Yards of embankment.	Price	Miscellaneous.	Amount.
29	Joseph Ralston,	161.78	1 62½	1714.42	11			completed	43			Grubbing, &12,	508 47
30	Parks & Lefevre,	91.82	1 62½	92.63	12½			completed	40				200 70
52	Dickey & M'Farland,	74.44	1 62½	89.30	12½			completed	40				164 62½
53	Cushens & Duncan,	119.56	1 62½	293.	14			completed	43 70				380 50½
	Michael Clarke,	68.50	2 50	491.	12½			completed	55	666 of S.	50	Embankment of earth, 667 at 12	681 42½
55	Wiley & Co	132.	1 62½					9 11	53				259 50
	D. & A. Kenney,	262.2	2 50	409.	12½			completed	40	497	20		796 02½
57	Hugh M'Cea.	6.	1 50	111.	12								21 22
	Robert Criswell,	51.29	2 50	87.	12			completed	18 75	448 of E	14	Embankment of stone, 214, at 50	324 35
41	Kenney, Moore & Moore,	55.82	1 50	271.78	12½			completed	40				154 70
42	Kelley & Morrow,	47.10	1 50	107.	14½			completed	40				141 06
43	Stewart & Co.	74.10	1 50	160.	12½			completed	45				176 15
45	Windrum & M'Kee,	81.	1 50	148	12	15	50	completed	45				196 56
46	William Kirkwood,	81.94	1 50	214.	10			completed	45				189 31
48	M. McDermott,	54.8	1 50	20.	10			completed	40				134 09
68	John Stoops,	438.	1 50	56.	18	15	50			67	12	Plnk. & timb. in found. 409¼ ft. at 7	703 16
64	John Stoops,	88.	1 62½	80.	12	20	50	completed	40				210 64
66	John Johnston,	98.	1 50	84.	12	15	50	completed	43	84	12		216 86
69	John Johnston,	101.	1 50	78.	12	23	50	completed	43	70	12		223 88
70	A. Hickenlooper,	68.	1 50	40.	12	20	50	completed	40	85	14		168 70
72	A. Hickenlooper,	74.	1 50	60.	15	20	50	completed	45	67	12		183 04
76	Samuel Wilson,	73.80	1 50	95.	15	27	50	completed	40			26 sqr. yds of paving at 40, 130 ft. of sheet piling, at 10 cts.	194 85
													$6,130 78

DRAINS.

Section 45, William Kirkwood, contractor, excavation of 846 yds of earth, at 12				$ 29 52
52, Samuel Martin,	do	do	1038 yds of earth, at 10, grubbing done at 30,	125 00
54, George Grant,	do	do	476.40 yds of earth, at 12½ do at 8,	67 55
57, John McGlade,	do	do	138 yds of earth, at 12 do at 5.	51 56
				$ 241 63

EXTRA GRUBBING.

Section 7, Brown & M'Laughlin contractors, grubbing (done)				$50	50
15, Laverty & M'Farland,		do	do do	50	50
16, J. & M. M'Carthey,		do	do do	50	50
45, Dodz, Windrum & Co.		do	do do	20	20
51, John Moore,		do	do do	12	12
52, John M'Glade,		do	do do	32	32
56, Smith & Riley,		do	do do	10	10
					$211

WASTE WEIR.

	Contractors.	Yards excavation of earth.	Price.	Perches pavement.	Price.	Perches cut stone.	Price.	Yards puddling.	Price.	Wood and iron work.	Prices.	Amount.
2	John Lafferty,	568	15	154	1 00	4.48	6 00	10	20		40.92	259
52	do do	146.33	15	63	1	7.68	6	14	20		40.92	182 24
50	do do	80	15	30	1						13	57
56	John Chinsworth,	100	20	105	1	5	7					160
												$658 24

ROADS.

Section No. 34, Wiley & Co. contractors,	24 rods of wood, at	$1		$24 00
No. 34, Millegan, M'Cutchio, & Co. contractors,	48	do	1	48 00
No. 35, Burroughs & Linn,	do	76	do	1	76 00
No. 36, Smith & Riley,	do	44	do	1	44 00
No. 59 & 60, James Peacock,	contractor,	109	do	1	109 00
No. 61, Marcus Boner,	do	88	do	1	88 00
No. 62, Pierpont, Morrison, & Co.	do	115	do	1	115 00
No. 63, S. Bills,	do	85	do	1	85 00
Sections No. 64, 65, 66, 67, 68, 69, 70, 71 & 72, John Johnston,	do	570	do	1	570 00
do No. 72, 73, 74, & 75, Hickenlooper & Shids, contractors,	847	do	1	847 00
				$1500 00

PROTECTION AT SALT WELL.

No. of Sections.	Contractors Names	Perches wall.	Price.	Yards Embnkmt.	Price.	Amount
17	Mercer, Smith & Co.	901 25	1	1945,99	16	$ 1309 59
34	S. Talmadge,	550	1			480 00
				Excava.		
15	D. & S. Keisler,			833	10	83 50
						$ 1,773 89

LOCK HOUSES.

Section No. 1, Spencer and Hagerty, houses completed, at 294, piazza in front and balestrade at head of stairs, upper story,				$298 75
do No. 2, do do houses completed at 294, piazza in front and balestrade at head of stairs, upper story,				30 75
do No. 3, do do houses completed at 294, cellar steps and balestrade at head of stairs,				3 75,
				$332 75
Stopping leak on No. 20, S. L. Jameson, contractor,	$3 98	Protection for bank below dam No. 1, T. Brown, contractor,	$150 00	$347 25

FENCE.

Carson, Clark & Co. 1300 rods fence, at 71,	$923 00

RECAPITULATION.

Of amount of work done on the Kiskeminetas line, western division of the Pennsylvania Canal.

Amount of work done on Sections,	$167,603 13	Amount of work done on Roads,	1,500
Culverts,	6,841 81	Protection at salt wells,	1,773 89
Locks,	43,997 68	Fence.	923
Water cement.	359 87½	Lock houses,	947 27
Bridges,	1,544 38	Stopping Leak,	5 98
Repairing sections,	2,152 16½	Protecting bank,	150
Slips,	20,711 41	Miscellaneous work amounting to	1,026 93
Inundated lands,	705 77	Amount of work done at the aqueduct at the mouth of the Kiskeminetas over the Allegheny,	75,000
Bridge embankments,	1,579 16½		$412,907 67
Dams,	56,835 70		
Filling in foundation of do	10,188 59		
Amount of work done on Guard banks,	1,629	Deduct amount done to last report,	122,723 69
Walls,	51,869 37	Aqueduct over Allegheny, at the mouth of the Kiskeminetas, (see report on Allegheny,)	59,000—181,723 69
Tow path bridges,	6,130 78		$ 231,180 98
Drains,	241 63		
Extra grubbing,	211		
Waste Weirs,	658 24		

STATEMENT of the amount of labour done upon the Kiskeminetas and Conemaugh line, Western Division, Pennsylvania canal, commencing at section No. 79, and ending at section No. 125, above Blairsville.

No. of sections	Names of contractors.	Grubbing.	Price.	Excavat'n of earth.	Price	Excavat'n of rock.	Price.	Yards embankment.	Price.	Excavation of rock be low bottom	Price.	MISCELLANEOUS.	Amount.
No 79	Lyons and Hyser,	this done	$ 70	Yds. 1870	6¼	Yds 913	37½	860	7½				$ 532 37½
"	Samuel Ready			1483	7½	931	40	840	8½				365 53¾
"	Samuel Richards			1750	12½	2300	50						1358 75
80	Miller and Shoemaker	section	50	3781	8	1430	50	9435	9				1926 63
81	Bachelor and Coulter	do	233	5600	8	2300	30	150	9				1847 49
82	William Warren & Co.	do	168	6300	6¾	3720	34	2885	8				1733 10
83	Philip Haley and Co.	do	180	4080	6	1020	50	3380	8				1530 80
84	Hugh M'Kee	do	150	4760	7	3081	40	655	9				1920 37
85	Joseph Moore	½ done	50	6671	6¾	1830	50	1311	7				995 68¾
	John Hamilton			5100	9	1060	50	2300	10				1614
86	Peoples and Patterson	do	130	10034	6	11300	39	3000	8				1460 54
87	James Speer	do	238	15300	7½	250	40	300	9				6579 50
88	do	section	40	7300	8	7910	39	3000	10				1016
89	M'Farland and Co.	do	300	9700	7	12354	40	5100	9				4342 90
90	Smith and Dunn	do	100	8200	8	21400	50	11580	9			Puddling 1931 yds at 20 cts.	7174 04
91	Jacob Drum	do	80	14700	7½	21750	55	2500	7				3866 70
92	Joseph Black	½ done	540	20850	8	11634	50						9738
93	Duncan and Cochran	½ done	200	11062	8	2047	50	850	12				4711 56
94	Johnston and Jones	section	53	14650	9	4874	45	3592	12½				3063 70
95	Crandal, Case and Co.	do	50	9450	8	1908	45	6870	10				3392 10
96	David Culbertson	do	42	9854	7½	1593	50	700	9				1341 95
97	Wallace and Stewart	do	200	24900	7½	12581	34½	3380	10				6625 01
98	Love and Drummond	do	140	11340	8	1575	45	6440	10				3416 25
99	Boyd and Long	do	25	11040	7	50	40	3100	9				1096 80
100	Kelly, M'Ilvaine and Co	do	240	11093	7	2184	37½	5589	8				2192 77
101	William Bradley	do	80	9890	7	180	37	3796	7				961 50
102	Hugh Curren	do	140	9877	8	2980	38	960	9				3792 96
103	Kiener and Martin	do	150	13780	7	4250	39	3980	9				3615 30
	Neel, Stewart and Co. tunnel dam No 4, guard lk No 4—work done equal.	973	30000										27300
105	Mountain and Stewart	section	175	4570	8	6900	35	8590	10½				2481 07
106	Work and Conway	do	156	4650	9	9180	35	1200	10				3944 50
107	Wilson and Everett	do	105	4970	7	3250	40	4290	9				2142
108	Burke, Powers and Co.	do	200	4165	8	2570	45	750	9				1757 20
109	Windrum and M'Kee	do	180	8457	7	1968	37½	507	9				1534 68
110	John Gallagher	do	300	14060	7	2262	44	400	10				2298 86
111	Merril and Dixon	do	260	21000	8	15539	45	3855	10				9192 77
112	Brown and Sawyer	40 ch.	5	21000	9	41000	30	7000	10				15000
113	Hankins and Co.	section	106	6400	8			4800	9			Grubbing 11 ch. at 58 per ch.	1204
114	M'Vay and Co.	½ done	50	8400	7	300	50	400	10				738
115	Thomas Johnston & Co.	section	80	13800	6	830	31	200	8				972 50
116	B. M'Manus and Co.	do	300	3000	7	16500	40	6000	10				7310
117	Michael Rafferty and Co	do	124	19000	6¼	4000	40	2000	8	400	60	Puddling 300 yds at 20 cents.	2964
118	M'Farland and Laverty	do	250	8000	6	25000	40			800	60	&10.	11220
119	James Blair and Co.	do	50	9701	6	7000	35			400	60		3392
120	Joseph Barnes and Co.	do	50	10042	8	1400	45	1410	10				1088 86
121	Lewis and Blakely	do	200	14717	6¾	1950	40	1100	10				2046 60½
122	Boner and Bradley	do	150	10815	6	20	40	8531	7				1402 37
123	Bradley and Boner	do	140	10000	6	100	50	8040	6				1070
124	Grier and M'Lain	do	280	13763	6¼	10840	33	4139	8				2031 91
125	Lewis and Blakely	14 ch.	7	200	12½	1600	50	4800	12½				1323
125	Keep and Crandal	20 ch.	7	8200	do	8180	50	1500	do				2192 30
125	Moore	5 ch.	7	2200	do	1300	50	2500	do				1410
													185218 40½

LOCKS.

No of Locks.	Names of Contractors.	Excavat'n of earth in pit.	Price.	Excavat'n of rock.	Price.	Embankment.	Price.	Perches of Masonry.	Price.	Yards Puddling.	Price.	Miscellaneous.	Amount.
G. lock 3	S. R. Richards	Yds. 18409	15	Yds. 1000	50	Yds. 1600	30	2030	4 12½	860	30		17033 60
L. lock 4													
No. 5	James Hyndman	5077	16	1040	50			785	8 93½	150	25		4401 75½
5	Isaac Harris					800	20	340	5	560	25		3000
6	John Moore	8378	13	210	50	807	20	790	4	74	25		4086 60
7	Hyndman	3804	15	980	50			579	3 87	800	25		2890 85
7	Isaac Harris & co.					500	20	410	2 25	600	25		2402 50
8	Jacob Drum	1171	13	811	50	894	20	793	4	610	25	Sheet piling, 8 rows $10	4114 45
9	Johnston & Jones	3094	15	94	50	2850 612	16½ 18½	793	4	1400	25	do 4 rows $10	4635 26
10	Kenney & Roberts	2262	15	550	50	1472	16	800	3 87½	636	25	do 4 rows $10	4497 57
11	Woodwarth & Martin	1524	15	953	50	500	16	640	4 62½	497	25	do 4 rows $10	3899 35
12	Sangers & Ingerson	540	14	1400 1610	50 75	720	15	1300	4 10	300	25	30 men bailing water at $1.	7167 70
13	Merril & Dixon & co.	800	14	1600 100	50 75	520	18	730	4 20	220	25		4801 60
14	G. W. Trout	4600	20	340	50	600	16	820	3 93½	700	25		4589 75
15	Lafferty & M'Mullin	2400	15	940	50	550 500 240	16½ 20 16	840	3 90	640	25		4154 40
16	Joseph Barnes & co.	3600 1100	14½ 18			600 600	20 20	660	4 25	620	25		5766 65
17	Smith & Charters	4400	15	1400	50	3400	20	1000	4 49	664	25		6496
Guard L. 5	Jones & Brown	400	16			5000	25	900	4 44	800	50		3350
do	Brom & Sawyer												2310
												Water line for locks	3291 70
													88869 71

AQUEDUCTS.

Aqueduct across Black Legs, Brom, Davis & Purse contractors, 723 yards excavation of earth, at 18 cts. 1231 yards of rock, at 50 cts. 320 yards embankment at 20 cts. 1201 perches of masonry, at $2 874 cts. 60 timber for run, at $7, 2 Coffer dams $100	5039 87½
Conemaugh aqueduct, M'Farland & Culhoun contractors, 600 yards excavation of earth, at 20 cts 500 yards excavation of rock, at 75 cts. 700 yards embankment, at 25 cts. 1271.13 perches masonry, at $3 75 cts. 104 yards puddling, at $50, 3 Coffer dams at $300 each 985 days bailing water at $1	11342 25
Conemaugh aqueduct, Brown, Pagan & co. contractors, 2930 bushels water lime, at 22 cts. 21684 perches masonry, at $9, 2 Coffer dams at $500 each, 780 days bailing water at $1 per day,	21877 50
Aqueduct over Mill run, Love & co. contractors, 500 yards excavation of earth, at 18 cts. per yard, 350 yards excavation rock, at 50 cts. 232 yards embankment, at 10 cts. 346½ perches of masonry, at $2 85 cts. 764 feet carpenters work, at 87 96 cts. puddling 110 yards at 25	1908 65
Stoney Run, Washburn & Merideth	2159 95
	42348 23

DAMS.

Dams, No. 3, Richards & Le Baron contractors, including protection above and below the dam				11606
No. 5, Moorhead & co.	do	22 done $5830,	16000 feet plank increased from 3 to 4 inches, at 1ct, 3000 plank added 3, 7431 lbs. iron added, at 10 cts. slope wall in abutments 600 perches at 90 cts.	5162 60
				16768 60

Cul	Price.	Miscellaneous.	Amount.
Sec		ing 35 yds. at 30; 105 perch. paving,	$310 18

$ 42
147
264 60
98
196
93 75

$841 35

Price	excavation of rock.	Price.	Amount.
			$ 360
10	700	45	535
			720
12½	2047	50	1383
			$2,998

lverts,	4,813 17
alls,	2,409 87
idges.	4,978 80
aste wiers,	$10 18
ck houses,	841 35
nbankments,	2,993 00
queducts,	42,348 23
	$349,556 31½

CULVERTS.

Culverts on Sections.	Names of Contractors.	Yards excavation of earth.	Price.	Yards excavation of rock.	Price.	Feet of timber.	Price.	Feet of plank.	Price.	Perches Masonry.	Price.	Miscellaneous.	Amount.
No. 80	Smith & Co.	19	15	15	50	261	7	190	3	42½	2 25		130 17
85	Joseph Moore,	198	15	22	50	908	7	440	3	1047	2 25	Puddling 156 yds at 25 cts	891 28½
86	Patterson & Co.	36	15			487	8	398	3	30½	2 50	do 116 25	161 02½
88	Brown, Davis & Purse,	72	15			942	7	542	3	50	2 50		218
95	Case & Carleton,	148	15			1100	8	402	4	160	2 25	do 106 do	512 78
96	David Culbertson,	50	15	24	50	220	8			24	2 37½	do 32 do	99 10
99	Long & Patterson	210	15			510	7	352	3	56	2 50	do 88 do	177 26
101	Woodworth & Man,	50	15	52	50	400	4			100½	2 50	do 109 do	328
	Robert Kelly,	110	16	40	50	515	8	350	4	6	2 50		107 80
												Embankment 520 yds 16	
107	Robert Given,	116	15			665	8	430	4	61	2 50	Puddling 57 at 25 cts.	357 75
108	Burke & Powers,	28	15	26	50					33	2		83 20
												Embankment 416 yds at 15	
110	John Gallagher,	591	15			870	8	380	4	74	2 25	puddling 96 yds at 25,	446 85
94	Jones & Johnston,	458	15	328½	50	2000	7			183½	2 25	do 168 do	818 70
117	Rafferty & Co.	80	15	210	50					133	2 25	do 100 do	441 25
121	Lewis & Blakely,	200	14			700	7	450	8	49	2 50	do 60 do	228
125	Keeo & Crandal,	100	20	50	50					80	2 50		245
123	Andrew Brown,												57 50
													$1815 17

WALLS.

Wall.	Names of Contractors.	Perches of wall.	Price.	timber.	Price.	Feet plank.	Price.	Stone.	Price.	Sheet piling rows	Price	Miscellaneous.	Amount.
Protection wall on Sec. 90,	Smith & Drum,	608	70										425 60
Wall at foot of lock No. 8,	Jacob Drum,	100	2										200
Protection wall around L. 5,	James Hynaman,	196	1 25										245
Slope wall at lock No. 9,	Johnston & Jones,	53	2	348	8	1310	5		5 00	1	$ 10		214 34
10,	Kenoey & Roberts,	90	2	348	8	1310	5		5	1	10		288 34
11,	Woodworth & Martin,	50	2	348	8	1310	5		5	1	10	Exc'at'n of earth	208 34
Batter wall on section 94,	Johnston & Jones,	70	70	360								15 yds at 15 cts.	54 75
Wall on do	16, Joseph Barnes,	60	1 50		8	960	38 40			1	10		167 20
	15, Lafferty & M'Mulleo,	60	1 50									Sundries 188 80	238 80
	102, Hugh Curran,												142 50
	111, J. B. Plumer,												55
	123, William Bradley,												200
													$ 2409 87

BRIDGES.

Bridges Roads.	Names of Contractors.	Perches Masonry.	Price.	Perches of masonry.	Price.	Yds. embankment.	Price.		Price.	Miscellaneous.	Amount.
On sect. No 91	T. P. Brower,	¾ done	$ 1 40	40	$ 1 25	400	$ 18		$		$ 227 00
94	John Anderson,	¾ done	1 40								93 33
95	Case and Carlton,	¾ done	1 39								92 66
96	David Culbertson,	¾ done	1 44								96 00
101	Robert Kelley,	¼ done	1 50								50 00
111	J. Gallagher,										135 00
Farm bridges on sect. No 96	Robert Graham,	¾ done	1 38								92 00
114	Griffith and Kean,	¾ done	1 30								104 00
120	Patton,	¼ done	1 38								113 75
121	Robert Graham,										92 00
122	Robert Graham,										130 75
T. path B. over Long run on Section.	Excavation of earth.			Excava. of rock.		T. work done		Perches of masonry.			
	Smith and McDogal,	100	15	90		40	$ 75	1 00	185¼	2 25	551 81¼
105	Mountain and Stewart,	200	15			40	$ 75	360	2 50	Embank. 560 yds. at 30 cts	1218 00
125	Smith & Co.	400	15	500	50	½ done	1 00	535	2 50	do 900 do 20 cts	1877 50
B. embankment, Sect. 94	Geo. Johnson,									do 500 do 15 cts.	75 00
											$ 4978 80

WASTE WIERS.

Waste Wier on Section No. 119, D. Washburn, contractor, excavation of 400 yds. of earth, at 15, puddling 35 yds. at 30; 105 perch. paving, $1, perches cut stone, 13.28, $6, timber, plank and iron work done, $50, grubbing and clearing, $5, $310 18

LOCK HOUSES.

Houses at Lock No 5 & 6,	Spencer & Co.	contractors,	½ done,	$294	$ 42
do at do No. 7,	do	do	½ done,	294	147
do at do No. 8,	do	do	⅞ done,	294	264 60
do at do No. 14,	Brown & Co.	do	⅓ done,	294	98
do at do No. 9,	Spencer & Co.	do	⅔ done,	294	196
do at do Nos. 10 & 11,	Brown & Co.	do	⅓ of done,	294	93 75
					$841 35

EMBANKMENT.

	Names of contractors.	Yards embankment.	Price.	Yards excavation of earth.	Price	excavation of rock.	Price.	Amount.
Guard bank at dam No. 5.	Moorhead & Co	3000	12					$ 360
Work done between Locks No. 12 & 13,	Ingerson and Sanders,			2200	10	700	45	535
Embankment adjoining aqueduct across black legs.	Davis & Co.	4500	16					720
Slip below locks No. 3 & 4,	Washington Webb,			2875	12½	2047	50	1383
								$2,998

RECAPITULATION.

Amount of work done on Sections.		157,918 40½	Amount of work done at culverts,		4,813 17
			do do	at walls,	2,409 87
			do do	at bridges.	4,978 80
Amount of work done on tunnel, guard lock, dam and Section No. 104,		27,300 00	do do	at waste wiers,	310 18
do do at locks,		88,869 71	do do	at lock houses,	841 35
do do at dams,		16,768 60	do do	at embankments,	2,998 00
			do do	at aqueducts,	42,348 28
					$349,386 31½

Bridge embankment on se	12½
Bridge do on se	12½
do do on se	10
do do 11 ,	12½
Embankment at Lock N	18

Where locate	Price of work.
2 bridges on sect. No.	$ 150 each
Bridge on section No 1	150
Bridge across turnpike	
No. 104,	35
Temporary bridge on s	12
do do on s	25
3 bridges on sects. No 1	150 each
Lock house No 5,	95 for completing
No 6 and 7	94 do each
Road on section No. 97	5 per rod
Grubbing do do	30 for completing
Road on section No,	lb. $100, ex. earth, 8cts R. 50
do on do do	48 for completing
Fence on sect do	87½ cts per rod
do from do 93	80 cts per perch
do around yard of loc	27 00 for completing
Puddling at locks No	27 cts per cubic yard
Filling breach on sectio	20 cts per cubic yard
Removing houses on sec	72 50 for completing contract
do houses on d	12 00 for completing contract
do timber on d	6 00 for completing contract
Puddling on section No	20 cts per cubic yard
Painting bridges on sec	24 50 each
do do do	24 50 for completing
Cutting stone for culver	
No 109,	25 cts per superficial foot
Iron for aqueduct at Pit	10 cts per pound
Bason between locks N	3 00 per perch of stone work
Excavation &c. at lock	exca. at engineer's est.
Water job at lock No 1	cts per yd ex. & 14 per yd em.
Water lime,	mate of the engineer
	cts per bushel.

NO. 9.

LIST of contracts entered into on the Allegheny line, from section No. 1 to No. 92. Western Division Pennsylvania canal, from the 1st of November, 1827, to the 1st of November, 1828.

SLIPS.

Slips, &c.	Contractors' names.	Date of contract.	Price per cubic yard. Earth.	Rock	Embankm't	Wall per perch.
			cts			
Slip &c. on section No. 8 and 9	N. West,	1st Feb.	10	50	12	50
10	S. R. Richards	6th Dec.	12½	50	grub est'g	
13	Abner H. Polly	6th April	9	50	10	
25	Hugh Carson	1st Feb	8	50	11	grub est'd
42	J. and S. Morrison	4th April	9	45	do	-
do	George W. Trout	do	9	45	do	
44, 45, 46, 47	Daily and Barrett	17th April	12	50	10	pud'g 20 c.
52 & 60	J. and J. Peacock	20th Oct	12	50		
67 & 68	Lemuel Castle	21st April	9	40	9	
do	James Hare	15th June	12½	40	8	
69 & 70	Phillip Kennedy	1st March	9	50	11	25
71 & 72	Samuel Everitt	do	9	50	11	
94	John Miller	12th March	14	45	10	
Drain and feeder on section 81	Henry Stroud	1st Nov	10			
do round locks No 3 and 4	John Moore	20th Oct	12		14	
Drain and feeder on section 81	Henry Stroud	1st Nov	10			
do on sections 23 and 24	James Gallagher	6th April	15			
Foundations of bridges on sec. No 53, 54, 59 and 60,	Eli Davis	16th Nov	7			
Drains on section 51	Nathan Waldo	12th Aug	2	40	for completing	
Section 64	Jenks and Myers	14th May	7		15	
Foundations of bridge on sections No 23, 25 and 27	Thomas Larden	16th June	14		do	
Breach on section 17	John Kearnes	3d April				12½
do 20	C. Kearnes	13th Aug				10
Repairing section 28 and 29	James Hare	do	10			10
do do 33	John Moore	20th Oct	10			
do do 36	Joseph Taylor	1st Nov	10			
do do 48, 49 and 50	J. and S. Morrison	20th Oct	10		10	
do do 56 and 57	Philip Kennedy	7th Oct	10			
do do 59	James Speer	20th Oct	10			
do do 3 and 4	William M'Kune	23d Sept	6	for	completing	
do do 23	James Cain	12th Aug	20		do	

EMBANKMENTS.

		Price	Additional items.
Bridge embank't on sec. No. 2,	Patrick and Gallagher	6th April	12½ $17 for removing cider press and grubbing
do 17	John Kearnes	13th Nov	14
do 22	B. Scouney	20th Oct	12½
do do 25	Carson and Clark	15th June	do $135 for completing bridge
do do 27	Jacob Pratt	12th Aug	do
do do 38	David Boyd	21st Dec	11 $3 for grubbing
do do 48	Buckman, West and Co.	5th Dec	12
do do 54	G. Romailly	16th June	12½
do do 65	James Thompson		11
do do 86 & 89	John Miller	12th Aug	11
Extra embank't on section 5	Wm. Bradley	11th Nov	14
Embank. at Bull c'k aqueduct,	David Sanger	25th Aug	14
Embankment at culvert on Sec.	Clark and Spencer	17th June	21 extra work est. engineer
do Bull creek aqueduct	J. Thayer	25th Aug	14
do on section 54	Nathan Waldo	17th April	10 excavation 10 cents
Embank't and road on sec 74	Joseph Alexander	12th Aug	20 $1 50 per perch of road
do on section 75	do	20th Aug	10
Bridge embank't on section 80	Henry Stroud	26th Nov	11
Embankment at breach sec 81	William Ramsey	15th Jan'y	9
do on section 75	J. Alexander	20th Oct	10
Emb. and drain round lock 3 & 4	John Moore	do	12 excavation 14 cents

MISCELLANEOUS CONTRACTS.

Painting bridges on sec. 4, 5, 17, 20, 84 and 98	John Keen	17th June	$15 each for four 17 two
Clearing inundated land sec 53	A. Stewart	22d Aug	42 12½ for completing
Repairing bridge &c on sec 91	James Miller	20th Nov	11 do
Safety gates on sec 54 and 55	Jenks and Myers	20th Oct	70 do each
Calking & wall at Bull c'k aque.	Jacob Horton	1st Nov	4 for calking 75 cents per perch for wall
Railing Deer, Bull creek and Squaw run aqueducts	James Bole	10th Oct	132 for completing
Road on sections 62, 63 and 64	James Thompson	20th Oct	25 cents per rod
Puddling &c on section 37	William Martin	14th May	18 8 for extra grubbing
Lock-house 1, 2, 3 and 4	Spencer and Hagerty	5th April	294 for completing
Iron for aqueduct at mouth of the Kiskeminetas	Le Barron and Lothrop	14th June	10 cents per pound
Repairing &c on sec 88 and 89	Edward Riley	17th June	118 for completing
Wooden spouts on sec 62 and 63	Donaldson and Co.	3d Dec	250 each
Deer creek job	Isaac Harris	16th Nov	6500 for completing

STONE WORK.

	Contractors' names.	Date of contracts.	Price per yard	Price per perch.	
Culvert on Section No. 82,	Robert Boyd,	5th March		2 00	
Repairing culverts on Sec. 54 & 57	Horace Woodworth,	16th June		4 14	$30 for completing
Slope wall on section No. 1,	Gallagher & Patrick,	17th June		75	
do do do 1,	Spencer & Clarke,	12th Aug		75	
Wall on do 9,	Buckman Sayre, & Co.	5th Dec		75	
do do 10,	Simon Lonergan,	17th June		25	
do do 13,	A. H. Polly,	20th Oct		75	
do do 16,	Alexander Riddle,	5th March		1 25	
do do 16,	John Kearns,	20th Oct		50	
do and puddling, 38,	Bull & Everitt,	4th April	20	25	
do do 48.	A. Woodworth,	18th July		2	
do at Kirkwoods' house, Sec. 73,	Norman Sackett,	1st Dec		1 50	
do on section, No. 65,	Jenks & Myers,	20th Oct		75	
do do 80, 81 & 82,	William Ramsay,	15th Aug		1	
do at Bull creek aqueduct,	D. Sanger,	10th Oct		1 50	
do lock No. 3,	H. Woodworth,	16th Aug		2	
do Buffaloe creek aqueduct,	James Bole,	10th Oct		75	
do Deer creek do	H. Woodworth,	30th Oct		1 50	

PUDDLING.

Puddling.	Contractors' names.	Date of Contract.	Price per yard
Puddling on Section No. 8, 9,	Nicholas West,	17th July	18
do do 16,	A. Riddle,	5th Jaouary	20
do do 25,	Hugh Carson,	12th August	18

WASTE WIERS.

Waste wiers.	Contractors' Names.	Date of contract.	Price per perch.	Superficial yards of pavement.
Waste wier on section No 24,	Spencer & Clark,	10th August	4 50	60
do do 7 & 28,	Martin & Love,	10th August	4 50	60
do do 56,	J. Chenaworth,	26th Nov.	7	1
do do 67 & 77,	Sackett & Smith,	29th July	6	96

BRIDGES.

Bridges.	Contractors' names.	Date of contract.	
Bridge on section No 17,	John Kearns,	5th Dec	$10 for completing.
do do 50,	John Keen,	13th Aug	145 do
do do 75,	James White,	10th May	150 do
do do 83 & 84,	William Lapsley,	21st Nov.	868 do

ROADS.

Roads.	Contractors' names.	Date of contract.	
Roads on section No 43, 44, 45 & 4	Dailey & Barrett,	17th April	$1 50 per rod
do do 62, 63 & 64,	James Thompson,	20th Oct	25 do
do do 68,	Allen Eddy,	5th Dec	1 do
do do 69 & 7	Phillip Kennedy,	17th June	1 50 do
do do 69 & 70,	Barclay & Kennedy,	3d Nov	1 do
do do 81,	William Ramsey,		6 yd. excavation.

WATER LIME.

John Keen contractor, date of contract 20th November, 20 cts for part, and 25 cts for remainder.

NO. 10.

LIST of contracts entered into on the Pine creek line, Western Division, Pennsylvania canal, between the 1st day of Nov. 1827, and 1st of November 1828.

	Contractors Names.	Date of contract.	Price per cubic yard. Earth.	Rock.	Embankm't
Section No, 102	Patrick Cassady.	19th July	8 cts.		14 cts.
109	John Bartley & Co,	10th Janv.	10 do	45 cts.	10 do
110	Felix Carran,	10th Janv.	10 do		10 do

SLIPS.

Slip on Section No. 99	James M'Cain & Co.	22nd April	10 do	40	10 do
do on do No. 100	J. & L. Wynn,	23d do	9 do	50	10 do
do on do do 101	Eddy and Johnston,	5th Dec.	12½ do	50	
do on do do 103	Gebby and Patterson,	12th May	9 do	45	10 do
do on do do 105	James Lonergan,	10th April	9 do	49	10 do
do on do do 106	Matthew Murdock,	12th Feb.	12½ do	45	12½ do
do on do do 106	Snudgrass & Black,	12th do.	12½ do	45	12½ do
do on do do 107	William Bradley,	30th May	12½ do	50	10 do

CULVERTS.

			Price per P. mason work
2 Culverts under road on Section No. 101	Eddy and Johnston,	5th Dec.	$ 30 00
Culvert on do do 102	William Bradley,	18th Aug.	2 25 comple-
do on do do 107	Riley and Cahall,	5th Aug.	2 30 ting.
do to drain water from tunnel	James M'Avey,	2nd Jan.	1 95

WALL.

Wall on Section No. 98	W. Crawford,	5th Jan.	62½	
do on do do 101	Eddy and Johnston,	14th April	25	10
Stone work to protect steam mill,	Jeffery and Loor,	22d Feb.	2 00	
Wall at locks No 7 and 8,	Sangen and Flemming,	10th Jan.	1 75	
Protection wall adjoin. pier head,	Provost and Byrne,	14th Aug.	2 25	
Pavement on section No. 106,	Matthew Murdock,	16th June	20	per square yd

EMBANKMENTS.

Bridge embankm't on sect. No 93,	Philip Miller,	9th Jan.	18½
Bridge do on sect. No 94	Crawford and Everett,	22nd Feb.	18½
do do on sect. do 109	John M'Causland,		10
do do 111, 112 & 113	Wm. Robison, jr.	4th Nov.	18½
Embankment at Lock No. 6,	Philip Miller,	1st Sept.	18

BRIDGES.

Where located.	Names of Contractors.	Date of Contract.	Price of work.
2 bridges on sect. No. 98 and 102,	Everett and Crawford,	14th Nov.	$ 150 each
Bridge on section No 104,	Enoch Jones,	23d April	150
Bridge across turnpike road on sect. No. 104,	John Scott,	19th Oct.	55
Temporary bridge on sect. No. 104	Enoch Jones,	10th Aug.	12
do do on sect. do 113	Wm. Robinson,	10th do	25
3 bridges on sects. No 110, 111, 113	Benjamin Vandegrift,	15th Oct.	150 each

MISCELLANEOUS CONTRACTS.

Lock house No 5, No 6 and 7,	Robert Beaty, Spencer & Hagerty,	5th April 5th do	$ 295 for completing 294 do each
Road on section No. 97 and 98	Crawford and Everett,	22nd Feb	5 per rod
Grubbing do do 100	Edward Riley,	30th May	30 for completing
Road on section No, 105	James Lonergan,	26th Sept	Grub. $100, ex. earth, 8cts R. 50
do on do do 108	Burns and Black,	14th Dec	48 for completing
Fence on sect do 109	Jacob Cups,	22nd Feb	87½ cts per rod
do from do 93 to 113,	Benjamin Vandegrift,	22nd Feb	80 cts per perch
do around yard of lock No 7	David Sanger,	5th Dec	27 00 for completing
Puddling at locks No 7 and 8	David Sanger,	20th May	25 cts per cubic yard
Filling breach on section 96	Nathan Waldo,	16th Sept	20 cts per cubic yard
Removing houses on section No 104	Enoch Jones,	27th April	72 50 for completing contract
do houses on do do 105	John Gibby,	5th Dec	12 00 for completing contract
do timber on do do 106	Matthew Murdock,	11th Jan	6 00 for completing contract
Puddling on section No 110	Thomas Flood,	5th Jan	20 cts per cubic yard
Painting bridges on sects. 104, 109	F. W. Kane,	17th Sept	24 50 each
do do do 113	J. W. Kane,	26th Sept	24 50 for completing
Cutting stone for culvert on sect. No 109.	Edward Doway,	26th Nov	25 cts per superficial foot
Iron for aqueduct at Pittsburg,	Le Barron & Lothrop,	14th June	10 cts per pound
Bason between locks No. 9 and 10	Provost, Byrne & Co.	5th July	5 00 per perch of stone work
Excavation &c. at lock No 7	David Sanger,	11th Feb	excav. at engineer's est.
Water job at lock No 10,	Provost, Byrne, & Co.	5th July	10 cts per yd ex. & 14 per yd em.
Water lime,	John Keen,	20th Nov	Estimate of the engineer
			25 cts per bushel.

ST of con

ween the first day of November

. of tions.	Na		Date of Contract.	Miscellaneous.
				Towing path bridges.
19	Samu		5th Dec	1 621 per perch $40 wood work
73	Will		14th Nov	Grub'g, cl'ng &c at $18 per a.
74	Asap		14th Nov	do do 18
78	Owe		16th Sept	Clearing ground $63 complete
			3d Nov	168 rods of fence 8
			3d Nov	64 do 4
13	Geor		3d Nov	84 do 8 40
20	do		7th Nov	4 do at 10 cts each
24	Dani		5th Dec	Removing & rebuilding house $25
18	Geor		16th July	do do $5
25	Phili		20th Jan	Removing stable 15
51	Jame		17th July	Removing salt house
51	Robe		22d Feb	Clearing Kiskeminetas below dam No 2, blasting rocks &c $65
55	John			
55	John			
& 69	John			
69	John		10th Jan	Excav. earth 12½, pud. 16 cts
70	J. B.			Excav for foundation of bridge
71	J. B.		1st Nov	12½ cents per cubic yard
71	John		3d Nov	do do
74	John		1st Feb	Excav of drain 12 cts per c y
			6th April	do do and foundation of bridge 12 cts per c y for earth and 50 cts rock
6	Powe			
7	P. M'		3d Dec	Ex. bridge foun. 14 cts c y'd
8	M'Cl		6th April	do do 12 earth 50 rock
15	M'Fa		16th June	do near lock No 1 earth 12 c
16	Danie		5th Dec	do earth 10 cts, grubbing $20
17	John		5th Dec	do 12 do 8
17	John		5th Dec	do 11 do 12
			1st Nov	Protection wall 80 cts pr per. puddling 20 cts, excav earth 10 cts per cubic yard
			5th Oct	Two bridges—$145 each
			15th Jan	Protection wall one dollar per perch, puddling 18 cts c y
				Water Lime.
			20th Nov	20 cts per bushel for part and 12½ cts for the other

LIST of contracts entered into on the Kiskeminetas line Western Division Pennsylvania canal, between the first day of November 1827 and 1st November 1828.

No. of Sections.	Names of Contractors.	Date of Contract.	Price per cubic yard. Earth	Rock.	Embank't.
			cts.	cts.	cts.
19	Samuel L. Jameson	14th March	9	45	12½
26	Marvin & Mecklin	1st do	8	40	10
29	Hugh Callan & co.	7th April	8		14
35	Culbertson & Keany	7th do	6¼	30	11¾
50	William Kerr	6th May	10	45	13½
58	D Pennington	15th Jan.	9	50	12
71	P. M'Laughlin	20th. Sept.	10	50	14
72	P. M'Laughlin	20th. Sept.	10	50	14
	SLIPS.				
3	G. D. Foreman	16th July	10	45	
4	James Andrews	14th May	12½	35	
4	G. D. Foreman	20th Oct.	12½	50	
5	J. R. Dodds	12th Aug.	12½	44	
6, 7	Nicholas Day	20th Oct.	12	50	12
8	M'Closkey & Barr	20th March	10	50	
17	Osborne & Senith	5th Feb.	12½	50	
28	Philip Haley	16th Sept.	12	50	
59, 60	J & J. Peacock	20th Oct.	12	50	
62	William Morrison	16th June	12	40	
	REPAIRING SECTIONS.				
8, 9	Nicholas Day	16th Sept.	completed,		$319
15, 16 17	George Hutchinson	14th Aug.	12	50	12 cts. pud. 20
54	James Ralston	14th do	12½	50	12½
36	R Creswell	1st Nov	12	50	14
57	Hugh M'Crea	12th Aug	10		12½
43	Smith, Riley & co.	1st June	10	40	12
46	David M'Kee	1st Nov.	10		18
52	Samuel Martin	12th Aug.	completed,		110 65
	WALLS.		per perch 25 feet.		pud
71	George Hutchinson	17th May	25		
18	Samuel Everett	6th April	1		20
18	Samuel Everett	20th March	1		
25	D. Gilmartin	10th Dec.	1 50		
26	A. Mecklin	16th June	75	slope, 1 50 perp.	
27	William Peoples	3d Nov.	75		
28	Philip Haley	16th June	1 50		
28	Philip Haley	16th June	1 50		
34	Burke & M'Laughlin	3d Oct.	80	protection $1	
35	Wiley & Bryan	3d Dec.	75		
39	David Culbertson	3d Nov.	75		
41	Patrick Kenny	20th March	73		
43	Thomas Riley	20th Aug.	80		
44	William Kirkwood	5th Dec	75		
45	David M'Kee	14th June	80		
59	J. & J. Peacock	20th Oct	50		
63	S. Bills	20th Oct.	1 50		
63	S. Bills	1st June	75		
64	Will. Kirowood	16th June	75	slope, 1 50 perp.	
65	John Johnston	do	75		
66	do do	14th do	82		
67	do do	3d Nov	75		
69	do do	16th June	75		
71	A. Hickelooper	5th Dec.	75		
72	J. Chenowith	20th Oct.	88		
			Walls.		
78	William Patton,	14th Aug	87½	per cubic yard of 25 ft.	
75	Samuel Wilson,	17th June	90	do	
77	Owen Boyle,	3d Nov	70	do pavem't 35 cts.	
	John Lafferty,	12th Aug	1 75	do. on grand lock No 1.	
	John Cover,	14th Aug	1 12½	do on lock	2,
			Pavements.		
70	J. B. Fore,	1st June	40 cts. square yard		
71	J. Chenowith,	20th Oct	35	do do	
73	William Patton,	14th Aug	55	do do	
74	Asaph Saunders,	14th Aug	55	do do	
78	Owen Boyle,	3d Nov	35	do do	
			Culverts.		
13	George Hutchinson,	20thOct	$3 50	per perch,	
20	do do	7th April	2 50	do	
24	Daniel Gilmartin.	16th June	2	do	
18	George Hutchinson,	20th Oct	3 50	do	
23	Philip Haly,	5th Dec	2 1	do	
51	James M'Caul,	21st June	2 50	do	
51	Robert Criswell,	12th Aug	3	do	
55	John Chenowith,	20th Oct	3 50	do	
55	John Lafferty,	14th Aug	2 75	do	
65 & 69	John Johnston.	17th June	20	for each culvert,	
69	John Chenowith,	1st June	20	completed	
70	J. B. Fore,	do	20	do	
71	J. B. Fore,	17th June	20	do for 2 culverts.	
71	John Chenowith,	20th Oct	20	do	
74	John Chenowith,	14th Aug	25	do	
			Puddling, Wall, &c.		
6	Power & Dobbin,	1st Feb	30 rock 20 pudg. $1 cubic yd.		
7	P. M'Laughlin.	2d th Feb	50 do 20 do	1	do
8	M'Closkey & Barr,	14th Jan	50 do 20 do	1	do
15	M'Farland & Laverty,	5th April	20 do		
16	Daniel M'Carthy,	6th April	rock 50 cts. puddling 20 cts.		
17	John Smith,	10th April	do 50	do	20
17	John Smith,	6th April	do 50	do	20

No of Section.	Names of Contractors.	Date of Contract.	Miscellaneous.
			Towing path bridges.
50	John Lefever,	5th Dec	1 62½ per perch $30 woodw'k
52	John M'Farland,	29th Sept	1 62½ do 40 do
53	Michael Clarke,	12th Aug	2 50 do
53	James Duncan,	29th Sept	1 62½ do 40 do
55	Patrick Kenney,	12th Aug	2 50 do
57	Robert Criswell,	12th Aug	2 50 do
41	Patrick Kenney	3d Nov	1 50 do 40 do
45	David M'Kee,	4th Dec	1 50 do 45 do
46	William Kirkwood,	3d Nov	1 50 do 45 do
49	Thomas P. Brown,	14th Aug	1 25 165 compl. for wood
63	Nathan Garret,	12th Dec	75 complete
66 & 69	John Johnston,	22d Feb	1 50 45 for each culvert
70 & 72	Andrew Hickenlooper,	5th Dec	1 50 45 do
76	Samuel Wilson,	16th June	1 50
			Bridges.
	Clarke & Spencer,	15th June	3 bridges at $185 each
	do do	15th June	3 do 107, 150, 150;
14 & 14	Hugh Carson,	1st Nov	3 do 185 each
	Clarke & Spencer,	15th June	1 do 145
10	Jacob Hill,	15th Aug	1 do 135
17	D. Brennaman,	6th April	1 do 150
21	Levi Pease,	5th Oct	1 do 20
72	Andrew Heckenlooper,	1st Dec	Bridge embankments.
	James Love,	22d Feb	9 cents per cubic yard
1	James Love,	15th Aug	14 do
10	Jacob Hill,	7th June	14 do
12	Daniel Kierler,	6th April	$150 for a bridge complete
17	D. Brennaman,	1st Dec	16 cents per cubic yard
17	John Smith,	24th Jan	11 do
18	Thomas Heckenlooper,	5th Dec.	12½ do
19	N. Waldo,	14th Aug	14 do
49	T. P. Bower,	22d Feb	13 do
53	J. M'Glade,	30th Nov	14 do (between dam No 1 and lock adjoining)
	John Lafferty,		Guard Banks.
Dam		20th Sept	20 cents per cubic yard
No 1	Joseph Hunter,	16th Sept	12 for each 50 cts rock G. L. 2
	S. Bills,	1st June	20
2	S. Bills,	22d Dec	$150 complete. Dam 1 and river wall.
	J. D. Browen,		Locks.
Locks		10th Nov	$4 50 per perch
1	Brown & Sawyer,	1st Oct	1469 53 complete
3	Samuel Dobbin,		Road.
Section		5th Dec	1 dollar per rod
35	Wylie & Bryan,	20 May	do do
54	Samuel Milligan,	5th Dec	do do
56	James Smith,	14th Aug	do do
59 60	James Peacock,	22d Feb	do do
62	William Morrison,	22d Feb	do do
63	S. Bills,	2d Nov	do do 2 bridges $8
65	John Johnston,		
66 67 68		5th Dec	do do
69 70 71	John Johnston,	5th Dec	do do
73 74 75	William Shields,		Miscellaneous.
	Alexander Hagerty,	5th April	Lock-houses 1 2 3 4, $294 ea.
Section	John Lafferty,	12th Aug	Waste wiers 4 at 6 dollars per perch. $1 pavement
7	Patrick M'Laughland,	16th June	Grubbing at $30
13	Andrew M'Farland,	16th June	do 50
45	John Windrum,	5th Dec	do 20
51	John Moore,	1st Nov	Additional clearing $12
51	John M'Glade,	16th June	Grubbing 20
23	Carson & Clarke,	25th Jan	Fencing from 1 to 78 section at 71 cents per rod
	David Leech & Trux,	3d April	Work on dam No 1 at 50 cts per cubic yard
	Samuel Everett,	14th Nov	Grubbing, cl'ng &c at $18 per a.
	Samuel Everett,	14th Nov	do do 18
	George Hawk,	16th Sept	Clearing ground $63 complete
30 31	Peter Duffy,	5d Nov	168 rods of fence 8
38	Hugh M'Kea,	5d Nov	64 do 4
42	James M'Dermott,	6d Nov	84 do 8 40
43	A. C. Stewart,	7th Nov	4 do at 10 cts each
28	J. Shillingberge,	5th Dec	Removing & rebuilding house $25
18	George Hutchinson,	16th July	do do 35
55	John M'Glade,	20th Jan	Removing stable 15
66	John Johnston,	17th July	Removing salt house
	S. Bills,	22d Feb	Clearing Kiskeminetas below dam No 2, blasting rocks &c $65
20	L. J. Jameson,	10th Jan	Excav. earth 12½, pud. 16 cts
41			Excav for foundation of bridge 12½ cents per cubic yard
	Patrick Kenney,	1st Nov	do do
43	A. C. Stewart.	3d Nov	Excav of drain 12 cts per c y
45	William Kirkwood,	1st Feb	do do 2nd foundation
45	David M'Kee,	6th April	of bridge 18 cts per c y for earth and 50 cts rock
			Ex. bridge foun. 14 cts c y'd
43	Samuel Kelly,	3d Dec	do do 12 earth 50 rock
45	David M'Kee,	6th April	do near lock No 1 earth 18 c
	William Brown,	16th June	do earth 10 cts. grubbing $20
52	Samuel Martin,	5th Dec	do do 12 do 8
53	George Grant,	5th Dec	do do 11 do 12
29	Joseph Ralston,	1st Nov	Protection wall 60 cts pr per. puddling 20 cts. excav earth 10 cts per cubic yard
15	Samuel Keesler,		
	Blair & Piper,	5th Oct	Two bridges—$145 each
2	J. H. Jones,	15th Jan	Protection wall one dollar per perch, puddling 18 cts c y
			Water Lime.
	John Keen,	20th Nov	20 cts per bushel for part and 12½ cts for the other

CULVERTS.

)	Smith & M' Dougal	20th March	2 25
;	Joseph & John Moore	4th March	2 25
)	Peoples Patterson	2d Oct	2 50
;	David Purse & co.	do	2 50
;	Jones & Johnston	16th April	2 25
;	Carlton & Case	27th Aug	2 25
;	D & J. Culbertson	20th June	2 37½
)	Patterson & Long	2d Oct	2 50

)odds,	150	10	40	30	10			
	200	9	25	20	13½			
.	200	8	37½	33	10	30	25	
lley,	45	7	35	20	8			
edy,	100	6	30	23	9	28		
l'Clofferty,	125	7½	45	21	10			
rds,		7	62	40	10			
	150	7¾	40	32	9¾			
llim,	150	7½	39½	30	12			
ke,	50	8	40	28	10			
& Co.		7	36	30	8			
e & Co.	200	8	41	25	11			
n,	175	6	37½	28	8	75		
nedy,	200	7½	33	24	9	30	15	
nedy,	100	6	40	25	9¾	30	15	
gher,	200	9	40	25	10			
wis,	300	8	47	33	11¼			
ins,	300	8	37	25	10			
& Co.	250	7¾	31	25	8	62½		
do	250	7¾	31	25	8			
acock,	290	8	40	26	10			
,	200	8½	41	20	9½			
,	185	8¼	40	21	9			
	410	9	37½	25				
Curran,	320	9	45	23	9			
ns,	300	8	37	25	11			
n,	340	7	40	25	11			
ndrews,	285	8	33	17	8			
,	200	7	39	18¼	9			

DAMS.

ucks,	$ 8,250	completed
ger,	9,990	completed
oon,	9,468	completed
disou,	8,400	completed

NO. 12.

LIST of contracts entered into on the Kiskeminetas and Conemaugh lines, between the 1st day of November 1827, and 1st November, 1828.

No. of Sections.	Names of Contractors.	Date of Contracts.	Grubbing.	Prices per cubic yard. Earth.	Rock.	Embank't.
				cts.		
79	Samuel Remley	1st Aug	Est of Eo.	7½	40	6½
79	Samuel R. Richards	17th Oct	do	12½	50	16
80	Shoemaker & Miller	2d Feb	$30 for S	8	50	9
81	Colter & Bachelor	4th March	Est of Eo.	8	50	9
85	John Hamilton	1st Aug	do	9	50	10
89	Luch. Dickey & M'Farland	30th Oct	300 for S	7	39	9
90	Drum & Smith	3d February	100 do	8	40	9
91	Jacob Drum	3d Feb	80 do	7½	50	7
107	Wilson & Everett	22d Feb	180 do	7	40	9
108	Burke, M'Laughlin & Powers	11th Dec	200 do	8	45	9
109	Windrum & M'Kee	22d Feb	120 do	7	37½	9
113	Neel & Hawkins	17th April		8	40	9
124	George Greer	21st June	280 do	6½	33	8
125	John Crandal	25th July	do do	12½	50	12½

LOCKS.

			Price per perch of Masonry.
5	Nathan Gould & co.	3d Oct	5
6	John Moore	1st Nov	4
7	Nathan Gould & co.	3d Oct	5 25
8	Drum & Gamble	3d Feb.	4
11	Woodwarth. Martin & co.	11th March	4 62½
13	Merril, Gallagher & co.	3d Feb	4 20
14	George W. Trout	29th Feb	5 93¾
17	Smith, M'Dougal & co.	13th May	4 49

GUARD LOCKS.

Guard L. No. 3 & Lift Lock No. 4	Richards & Le Barron	17th March	4 20½
5	Jones & Brown	20th May	4 44

EMBANKMENTS.

Where located.	Names of Contractors.	Date of Contracts.	Price per Yard
Bridge embankm't on section No. 94.	George W Johnston	29th Aug	15
do do do 111	John Gallagher	do	13
do do do 120.	Joseph Barnes	do	14
do do do 121.	Blakely & Lewis	25th July	12½
Guard bank do 122.	Courhead & Bishop	17th May	12
Embankm't at aqueduct on black leg.	Davis, Brown & co.	2d Oct	16

PUDDLING &c.

Where located.	Contractors names.	Date of Contract	Price per Yard	Excav'n of rock below bottom per yard
Pud. on sec 90	Drum & Smith	2d Oct.	20	
do 117	Michael Rafferty	do	20	60
do 118	Daniel Gilmartin.	do	20	60

MISCELLANEOUS CONTRACTS.

Where located.	Contractors Names	Date of Contracts.	Earth pr Yard.	Rock pr Yard	Embank't. per yard.	Puddl'g
Slip adjoining L No. 4	W. Webb	21st Aug	1½	50		
Station at Lock 17	Charter, Smith & co	20th Jan	10	50	12½	
Excavat'g at Lock 112	Sangers & Ingersol	25th July	10	45	13½	15
Extra grub. on sec. 113	N. & D. Hawkins	20th Aug	$100 for completing,			
Lock houses No. 10, 11	J. & R. Brown	4th Jan.	$80	do		
Waste Wier un sec. 119	Washburn & Merideth	2d Oct	$6 mason work		1 05 of pavem't	

AQUEDUCTS.

Where located.	Names of Contractors.	Date of Contracts.	Price per. perch of Masonry	Trunk per lineal foot.
Over Saw Mill run on sec. 98	Samuel & Robert Love	25th June	2 85	7.96
Over Black Legs creek	Davis, Purse & co	17th April	2 87½	7
Over Conemaugh river	Cahoon, M'Farland & co.	25th Jan	5 75	
do do	W. Brown & co.		9	

DAMS.

			per foot run.	To al Price.
Dam No. 3	Richards & Le Barron.	2d Nov 1827	$19 99/100	
do 5	Moorehead & Bishop	do		$3850
Dam Tunnel, Guard Lock on section No. 104.	Stuarts & Neel	25th Nov.		30000

WALL.

			per perch.	Excavation of foun. pr. yard
Wall on section No. 94	Johnston & Jones	25th July	75	15
do do 90	Drum & Smith	20th June	70	
do do 102	Hugh Curren	2d Oct	37½	
do do 111	John Plumer	11th Oct	93	
do do 128	W. Bradley	20th June	1	
do at Lock No 5	James Hyndman	20th June	1 25	
do do 8	Drum & Gamble	2d Oct	2	
do do 9	Jones & Johnson	2d Sept	d	
do do 10	Kenney & Roberts	2d Oct	1 50	
do do 15	Lafferty & M'Mullen	do	2	
do do 16	Joseph Barnes	25th July	1 50	
do at Dam No 3	Samuel R Richards	2d Oct	60	per yard.
do at Bridge on section 121	Robert Graham	do	1 25	

CULVERTS.

Culvert on section No. 80	Smith & M Dougal	20th March	2 25
do do 85	Joseph & John Moore	4th March	2 25
do do 86	Peoples Pattersun	2d Oct	2 50
do do 88	David Purse & co.	do	2 50
do do 94	Jones & Johnston	16th April	2 5
do do 95	Carlton & Case	27th Aug	2 25
do do 96	D & J. Culbertson	10th June	2 37½
do do 99	Patterson & Long	2d Oct	2 50
Culvert No. 1 on section 101	Martin & Woodworth	20th June	2 50
do 2 do 101	Robert Kelly	2d Oct	2 50
do on section No. 107	Robert Given	29th Aug	2 50
do do 108	Burke and Power	2d Oct	2 5
do do 110	John Gallagher	4th March	2 25
do do 117	Michael Rafferty & co.	4th Jan	2 50
do do 118	Daniel Gilmartin	10th Nov	2 50
do do 121	Blakely & Lewis	5th March	2 50
do do 123	Andrew Brown	2d Oct	2 50
do do 128	John Crandal	do	2 50

BRIDGES.

			Price of work completed.
Road Bridge on section 91	Thomas Brown	29th Aug	140
do do 94	James Anderson	2d Oct	140
do do 95	Carleton & Case	25th June	139
do do 101	Robert Kelley	20th June	150
do do 111	John Gallagher	20th June	140
Farm Bridge on section 114	Frean & Griffith	29th Aug	130
Road do 117	Adam Ross	2d Oct	144
do do 119	Richard Patton	20th June	145
do do 120	Richard Patton	20th June	130
Farm Bridge on section 96	Robert Graham	25th July	138
do do 121	do do	do	138
do do 122	do do	do	138
Bridge at Guard Lock No. 5	do do	do	50
Tow path bridge on section 80	Smith, & M'Dougal	20th March	50 for stone work. Perches stone work.
do do 105	Stuart & Mountain	6th March	2 50
do at Lock No. 17.	Smith, M Dougal & co.	13th May	2 30

NO. 13.

LIST of Sections on the Legonier Line, names of Contractor's and prices of each description of work

Sections	Names of Contractors.	Grubbing.	Earth.	Hard Rock.	Loose Rock.	Embankment	Stone Wall.	Puddling.
1	George Mulholland, jr.	$6 per ch	8 cts	25	20	8		
2	Jas. and John Sheridan,	65	6½	37	25	8		
3	M'Kinstry and Lardin,	225	8	35	15	9	50	
4	John Clarke,	250	8	37	19	11		
5	Wheelan Johnson,	50	7	25	18	8		
6	Bartley and Welsh,		6					
7	Cochran and Duncan,	10	7	38	20	9		
8	Kennedy and Cassady,	200	7	31	20		55	
9	Jer & Daniel M'Carty,	180	7	30	28	9		
10	Michael Davis,	3 0	7	31½	23	8		
11	M'Bride and M'Glaughlin,	295	7	42	20	9		
12	Henry Bean,	180	8	50	15	8		
13	Beehan and Meehan,	150	6½	40	27	7		
14	Brown and Marshall,	250	7½	45	23	9		
15	McKinstry and Lardin,	30	8	40	25	9		
16	Armstrong, Patterson & Co.	190	7	45	30	8		
17	Hugh McCrea,	120	7	30	15	8		
18	Alexander McFarland,	300	6	30	20	8	50	20
19	Alexander McFarland,	50	6	30	25	8	30	20
20	Jas. & Arch. St. Clair,	175	7	40	36	9		
21	Jeremiah Mahony,	200	7	30		9		
22	George Hutcheson,	400	8	4	20	9		
23	Moore, Mahony & Co.	100	7½	37	31	8	35	9
24	Welsh and McCulden,	50	6	37½	28	8		
25	Dodds & Co.	100	8	50	30	10		
26	Sheehy & M'Carty,	150	7½	39	25	11		
27	Morice, Mahony and Ryon,	150	7	36	31	9		
28	Daniel Gilmartin,	150	6	40	60	6½	75	
29	Jos. and Arch. Dodds,	100	10	40	30	10		
30	John O'Donnell,	100	9	25	50	13½		
31	John Coyboy, jr.	200	8	37½	33	10	80	25
32	Brown and Bradley,	45	7	35	50	8		
33	Reily and Kennedy,	100	6	30	23	9	28	
34	Gallagher and M'Clofferty,	125	7½	45	21	10		
35	Lang and Richards,		7	62	40	10		
36	John Boland,	150	7½	40	32	9½		
37	Johnson and Killim,	150	7½	50½	30	12		
38	Firbush and Burke,	50	8	40	28	10		
39	John M'Elroy, & Co.		7	36	30	8		
40	M'Entire, Clarke & Co.	200	8	4	25	11		
41	Daniel Gilmartin,	175	6	37½	28	8	75	
42	Reiley and Kennedy,	200	7½	35	24	9	30	15
43	Reiley and Kennedy,	100	6	40	25	9½	30	15
44	Smith and Gallagher,	200	9	40	25	10		
45	Blakely and Lewis,	300	8	47	33	11½		
46	Walsh and Colhus,	300	8	37	25	10		
47	James Lonergan & Co.	250	7½	31	25	8	62½	
48	da do do	250	7½	31	25	8		
49	Wilson and Peacock,	90	8	40	6	10		
50	Edmund Burke,	200	8½	41	20	9½		
51	Edmund Burke,	185	8½	40	21	9		
52	John Henry,	410	9	42½	25			
53	Hugh and John Curran,	320	9	45	23	9		
54	Raley and Collins,	300	8	37	25	11		
55	Wm. W. Martin,	340	7	40	25	11		
56	Jas. and W. Andrews,	285	8	33	17	8		
57	Geo. L. Dickey,	200	7	39	18½	9		

DAMS.

No. 1	Geo. and J. Trucks,	$ 8,650	completed
2	Jones and Sanger,	9,990	completed
3	Sutton and Mahon,	9,468	completed
4	Merills and Addison,	8,400	completed

No. 14.

Statement of the amount paid for damages on the Western Division of the Pennsylvania Canal, since the report of last year.

TO WHOM PAID.	AMOUNT.
John Moore	$ 16
Henry Richabaugh	6 75
Thomas Hickenlooper	20
Binnaman and Fay	300
George Space	40
Thomas M'Mullen	8
Michael Risher	32
Henry Fore	20
William M'Kee	35
Joseph Hunter	40
Owen Boyle	20
David Brinnaman	576
Robert Smith	2 50
Robert Kelly	12
John Gallagher	50
William Beard	12
William M'Clelland	12 50
William Drummons	15
William M'Farland	400
Thomas Johnston (of John)	270
E. Jellison	20
Joseph Barnes	20
John Drummond	350
L. S. Waterman	20
Wilson Crawford	152
James Munden	50
James Sharp	20
Andrew Gallagher	12 50
Enoch Jones	72 50
James M'Kibbon	38
	$ 2,641 75

Damages agreed to be paid

To	A. Kirkwood	225
	George Hawk	110
	Robert Park	350
		$ 685

No. 15.

LIGONIER LINE.

A list of persons employed in the Engineer Department.

James D. Harris	Engineer	177	days ending	24th	Nov. 1828.	at $2000	per annum.
Atlas Lacock	Principal assistant	177		24		3 50	per day.
Caleb A. Alexander	Sub assistant	177		24		2	do.
James Robinson	do.	45		24		2	do.
Thomas P. Enoch	Rodman	177		24		1 50	do.
John Murrey	do.	47		24		1 50	do.
James Robinson	do.	132		10	Oct.	1 50	do.
James Finton	Axeman	87		29		1	do.
John Flack	do.	69		8	August	1	do.
James M'Owen	do.	108		24	Nov.	1	do.
Curtis Dixon	do.	16		24		1	do.
Benjamin Lawrence	do.	32		24		1	do.
do	chain-man,	69		8	August,	1	do.
John Murrey,	do.	69		8	do.	1	do.
Edward Wilkinson,	boatman & camp keeper,	60		5	do.	1	do.

The above is a list of persons employed in the engineer department, on the Ligonier line, western division Pennsylvania canal, up to and including the 24th November, 1828, with the length of time served by each in his respective capacity.

JAMES D. HARRIS, *Engineer*

November 28, 1828.

ALLEGHENY AND PINE CREEK LINES.

A list of persons employed in the Engineer Department.

James D. Harris	Engineer	193 days ending	31st May, 1828,	at	$ 1400	per annum.
Atlas E. Lacock	Assistant engineer	6 months 11 days	31		60	per month.
Andrew D. Harris	do.	6 months 11 days	31		60	do.
Francis Reno	do.	6 months 11 days	31		60	do.
do.	do.	188 days	24	Nov.	2	per day.
Wilkins M'Nair	do.	45	24		2	do
Andrew D. Harris	Principal assistant eng'r	188	24		4	do
James Robinson	Rodman	193	31	May	1 50	do
Caleb A. Alexander	do.		31		1 50	do
James S. Keen	do	186	10	October	1 50	do
Wilkins M'Nair	do	325	10		1 50	do
Patrick Griffen	do	79	23		1 50	do
James Steel	do	32	24	November	1 50	do
Joseph Coltart	Superintendant masonry	152	24		3	do
William Sheehy	Axeman	162	13	June	1	do
Edward Sheehy	do				1	do
James Stewart	do	182	24	November	1	do
Patrick Griffen	do	45	5	August	1	do

Clerk of the western division, R. L. Keen, $ 3 a day.

The above is a list of persons employed in the engineer department on the Allegheny and Pine creek lines of the western division of the Pennsylvania canal, from the 21st November, 1817, to the 24th November, 1828, inclusive, with the length of time served by each in his respective capacity. Since the 31st May, one party has done the business on each line. In future one party will be sufficient for both until completed

JAMES D. HARRIS, *Engineer.*

November 28, 1828.

Persons employed in the Engineer Department upon the KISKEMINITAS AND CONEMAUGH line of the Pennsylvania Canal.

Names of persons employed.	In what capacity.	Month began.	Day	Month ending.	Day.	No days served	Wages per day.
Charles H. Rondolph	Assistant engineer	August	16	December	15	108	$ 2 00
Michael Kennedy	do	do	16	do	15	108	2 00
D. R. Bishop	do	do	16	do	15	108	2 00
Hugh Smith	Superintendant	do	16	do	15	108	3 00
William Moore	Rod man	do	16	do	15	108	1 50
William Heckinlooper	do	do	16	do	15	108	1 50
James G. Brown	do	do	16	do	15	108	1 50
Silas Fulton	Axeman	do	16	do	15	93	1 00
James M'Laughlin	do	do	16	do	15	93	1 00
Edward Day	do	do	16	do	15	93	1 00
William Hamilton	do	do	16	do	15	93	1 00
Nathan M'Dowell	do	do	16	August	22	5	1 00

KISKEMINETAS LINE.

Persons employed on the Engineer Department of this line.

	IN WHAT CAPACITY.	WAGES.		IN WHAT CAPACITY.	WAGES.
William B. Foster, jr.	Principal assistant	$ 3 50 per day.	James E. Day	Rod-man	1 50 do.
John B. Miles	Sub assistant	2 do.	Silas Fulton	Axe-man	1 do.
E. R. Livermore	Sub assistant	2 do.	James B. Park	do.	1 do.

Series 2:

H. R. 47.—No. 1.

To the board of Canal Commissioners.

GENTLEMEN:

Having received during your session in June last, notice of my appointment as superintendant of the French creek feeder, and also instructions relating to the duties of the said appointment, I immediately proceeded to the line, and upon receiving from General Philips the books, contracts and papers, relating to that part of the feeder then under contract, I commenced the duties assigned me.

The first estimate which it became my duty to liquidate was dated the 1st July. At that time (with the exception of three or four sections) it was believed that the number of hands then employed, would have been sufficient to have completed the work, if not within the time specified in the contracts, at least very soon afterwards.

It was, however, found that early in the month of August the number had been considerably diminished, the cause of which was attributable to a large portion of them being at home, engaged in agricultural pursuits, and compelled to attend to their harvests.—About the first of September a sufficient number was again believed to be on the line; but the loss of one month when the weather was most favorable for canalling, and owing subsequently to an unusual quantity of wet weather, the progress of the work has been unavoidably retarded; consequently this division is not as had been anticipated entirely completed. Twenty sections however out of thirty five have been reported as completed, and paid for accordingly. With a view of hastening the completion of the contracts, notice was given to the contractors, at the payment of the October estimate, that one other estimate would be paid on the 15th of November, after which no further payments would be made until the completion of their contracts. This course has had a most salutary effect. The extreme wetness of the season has occasioned a constant continuation of hill slips on four particular sections, and although two of them would require but six days of dry weather to complete them, yet owing to the unsettled state of the weather, I have deemed it prudent to stop the contractors, until a more favorable time shall arrive for adopting such a plan as may be best calculated to ensure security to the work, reserving on behalf of the state a portion of the retained percentage, to ensure their completion at the contract prices. With the exception of these four sections, and two others, I think this division will be completed on the first of January next. For further particulars I refer you to the report of the engineer, which together with various statements furnished in compliance with the request of your secretary, will give all the necessary information with regard to this part of the line.

In compliance with a resolution of your board, I sold out on the 28th of August last, a section of ten and one half miles, designated the Western division, and commencing at the southern termination of the former letting, (passing French creek by an aqueduct of two hundred and seventy feet in length,) and terminating near Muddy run, being about two miles short of Conneaut lake. The course of this division of the feeder has been delineated, and the sketches already presented to the board. The contracts were immediately entered into, and the work commenced within fifteen days from their dates. A list shewing the names of he ocntractors together with the contract prices, and including that for the aqueduct, is herewith presented. The estimate on this division taken on the first inst. shews in amount $8,331 10, which has been paid, deducting twenty per cent, and will also tend to shew the progress of the work. Having laid off this division in sections of not more than eighty perches in length, and having thereby increased the number of contractors, by giving but one section to each, I can say with great confidence that this division, with the exception of the aqueduct, will be finished within the time specified in the contracts, to wit, on the 1st of October next. Messrs. Collums, the contractors for the aqueduct, are men of good standing in society, and proverbial for industry and enterprise; I have therefore every thing to expect from them, and rely most confidently on the early completion of their contract.

The termination of this division being short of that authorised to be let, it becomes necessary for me to explain the reason. Soon after passing Muddy run, the country presents itself in shapes which rendered the tracing a line of feeder a more difficult matter than had been anticipated.

The marsh between Muddy run and Conneaut lake, and indeed the country for some distance round the lake, consists of a series of ridges divided from each other by swamps. Should the lake be embanked to a height of eight feet above its common surface, according to the original plan for the feeder, the feeder would be brought into it, following the upland which connects with the eastern shore of the lake, and all the swampy outlets from it, secured so as to prevent the escape of water from the lake, thus constructed into a reservoir. If on the contrary embanking the lake should be found impracticable, the feeder must take the most direct course to the summit, which must be done not by following the course of any of these insulated ridges, but by crossing them, and the marshes which divide them, by a series of alternate excavations and embankments. The reason for making the course as direct as possible, being to prevent lowering the summit, which an increased length of feeder. preserving the necessary descent would of course occasion. If the lake were embanked, then the feeder beyond Muddy run would not have the same location, or the same length which it must have if it were embanked. It becomes necessary then to determine this preliminary, which by the last report of the engineer who reported the project, was spoken of in very general

terms. It was therefore determined to stop the location at Muddy run, and make as early as possible other examinations in that neighborhood. A party for this purpose was formed and commenced their operations on the 27th of October, and terminated about the middle of November, having extended their examination with a view of ascertaining the propriety of adopting the lake as the summit and reservoir, and necessarily so as to the two summits connecting with Big Conneaut and Chenango creeks, of which a detailed report accompanied with the necessary plans, &c. will be made and presented by the engineer, Mr. Ferguson, as early as possible.

All of which is respectfully submitted.

J. MITCHELL, *Supert.*

Meadville, 15th November, 1828.

H. R. 48.—No.2.

Report and Estimate of the work remaining to be done on the French creek feeder, by James Ferguson, Engineer.

To JOHN MITCHELL, Esq.

Superintendant of the French Creek feeder.

SIR,

I submit the following estimate of the probable expense of completing the part of the feeder now under contract. viz.

For the part on the east side of French creek.

Excavation on sections 2 3 4 15 16 18 19 20 26 30 31 32 and 33.—46,918 cubic yards, amounting to	$6,388 00
Embankment on sections 3 4 16 19 20 24 25 26 and 30 including bridge embankments, 2,911 cubic yards, amounting to	4,242 00
Inside wall on sections 2 3 5 12 17 18 19 20 30 31 33 and 34.—4,702 cubic yards, amounting to	5,877 50
Culverts, sums required for their completion, being partly 20 per cent. of the contract prices retained until they shall have been proved	3,060 27
Bridges, sums required for their completion. The unfinished bridges being on sections 3 4 30 35 and one in the village of Meadville,	760 00
Fencing,	2,000 00
	$22,327 77

In the above estimate I have not included the contemplated basin at this place, nor the price of re-making roads, where their sites

have been occupied by the feeder. The expense of inside wall is an unexpected and unforseen one, which has not made part of any previous estimate: it becomes necessary as a protection against quick sands, where the bank out of which the canal has been cut, rested upon a substratum of this treacherous material.

Of the amount stated as necessary to complete the culverts on the line. $1.0 0 2⁷ is made up of the sums retained on the culverts until they shall have been tried, by admitting into the feeder above them, sufficient depth of water to prove their soundness.— The remaining $2,000 includes the expense of works in the neighborhood of Magaw's mill. The usual precaution of furnishing water lime to the contractors, that the precise quantity used, and the quality of the cement made from it might be certain, was not adopted here, and therefore. so much confidence cannot be entertained in those parts of the work which require the use of this material. The sums reserved on the culvers will however, be entirely adequate to render them secure. The well fall and culvert at Magaw's mill have been more expensive than was expected; and it is matter of question whether a cheaper disposition of the mill run might not have been made than that which I have attempted.

The cost of this part of the feeder, being a length of 8.81 miles will be $126 059, making an average cost of $14,300 per mile.

In making this estimate the sections which have been accepted are set down at their full value They being sections 1 5 6 7 8 9 10 11 12 13 14 17 21 22 23 24 27 29 34 and 35, the other sections are rated at the value of the estimate of the 15th October last. The bridge and culvert estimate amount nearly to the sum which will be required for their completion.

The aqueduct across French creek,	$18,910 00
The part of the feeder on the west side of the creek.	
Excavation and embankment including bridge embankments at contract prices.	$78,163 00
13 Farm bridges,	1,300 00
3 Road bridges,	705 00
Wast wiers,	920 00
Fencing,	3,200 00
Cost at contract prices,	$84,288 00
Amount estimated to be due for work done 1st November,	8,331 00
Sum necessary to complete this part of the feeder,	$75,957 00

This sum does not include the expense of re-making part of a county road which will be covered by the feeder, nor of a small culvert on section 66, but contains every other expense necessary to complete this part of the feeder. The whole amount required will be as follows:

For the part on the east side of French creek,	$22,327 77
For the aqueduct,	18,910 00
For the part on the west side of French creek,	75,957 00
	$117,194 77

Truly your obedient servant,
J. FERGUSON,
Engineer.

Meadville, November 26, 1828.

H. R. 49—No. 3.

To JOHN MITCHELL, Esq. *Superintendant of the French creek feeder.*

SIR—In executing the duties required from the engineers on this section of canal, from the date of the last annual report, the following persons have been employed for the times and at the rates hereinafter specified, to wit

A. B. Vincent, assistant Engineer to 1st June, $ 2 per day,

D. B. Vincent, principal assistant engineer from 1st June to present time at $ 2 per day.

W. Pollock, assistant engineer from 1st June to present time at $ 2 per day.

I. D. Torbet, assistant engineer from 1st June, at $ 2 per day.

I. D. Torbet, target bearer from 15th February to 1st June at at $ 1 50 per day.

Robert Neal, target bearer from 1st June to 8th October, at $ 1 50 per day.

Kinnaird Hamilton, target bearer from 1st June to present time at $ 1 50 per day.

H. I. Luden, target bearer from 1st June to 10th October, at $ 1 50 per day.

H. I Luden, target bearer from the 27th October to 15th November, at $ 1 50 per day.

H. R. Vincent, target bearer from 27th October to 15th November, at $ 1 50 per day.

Robert Neal, chain man from 15th February to 1st June, at $ 30 per month.

K. Hamilton, chain man from 15th February to 1st June, at $ 30 per month.

J. M. Stockton chainman from 3d June to 26th July, at $ 20 50 per month.

Alva Mallary, chain man from 3d June to 26th July, at $ 20 50 per month.

William Rundle, axeman from 3d June to 26th July, at $ 20 50 per month.

Robert Erwin, axeman from 3d June to 26th July, at $ 20 50 per month.

Robert Erwin, chainman from 8th October to 20 November, at $ 30 per month.

J. M. Stockton, chainman from 27th October to 20th November, at $ 0 66 2-3 per day.

J. Tortie, chainman from 27th October to 20th November, at $ 0 66 2-3 per day.

Amberson Williams, axeman from 27th October to 15th November, at $ 0 66 2-3 per day

W. Lefevre, axeman from 27th October to 15th November, at $ 0 66 2-3 per day.

John Mitchell, superintendant, at $ 3 per day.

John Ferguson, engineer, at $ 2,000 per year.

Clerk, $ 2 50 per day.

From the 22d December to the 15th of February the inspection of the line was confided to Mr. Vincent, he being the only person retained during that period. After that and until the 1st of June the party consisted of myself, Mr Vincent, Mr. Torbet, and two chainmen. After the 1st of June, the party was augmented for the purpose of prosecuting the location on the west side of French creek, and the same establishment continued until the 26th July, at which date the location had been completed to Muddy run; or, within about two miles of Conneaut lake. At this point the country presented difficulties which had not been anticipated, rendering it impossible to determine the best site for the feeder until the approaches to the summit had been more accurately examined. These examinations were commenced on the 27th October, and will have been completed in a few days, after which it is intended to retain only Mr. Vincent, one target bearer and one chainman I respectfully suggest to you the propriety of having the rate of Mr. Vincent's compensation settled by an order of the board at as early a period as may be convenient.

am, Sir, respectfully
Your ob't serv't.
J. FERGUSON
Engineer.

Meadville, November 16th, 1828.

tern divisio unt of work done, payments
ained, up t

Inside slope wall	Cost grd.	Retained.	Paid.	
perches	Cts			
	8		2679 68	completed
	14	1107 88	4431 56	
	38	314 65	1258 72	
		27	108	
		38	152	
	74	519 73	2079 01	
	30	78 66	314 64	
	25	96 65	386 60	
		19	76	
	10	138 82	805 28	
	33	17 75	552 58	
	17	353 63	1414 54	
			416	
			236	
	00½		7119	
	84		340 84	completed
	90½		2111 80	completed
		100	450	
	56	159 71	638 85	
4	66		7089 66	completed
	75	275 14	1100 59	
		18	72	
	33	836 44½	1545 88	
	98	1721 18½	6884 77	
	50	961 49	3846 01	
			60	
1180	86		3887 36	completed
	22		3118 22	completed
	14	9505 90	96 59 24	

Robert Erwin, axeman from 3d June to 26th July, at $ 20 50 per month.

Robert Erwin, chainman from 8th October to 20 November, at $ 30 per month.

J. M. Stockton, chainman from 27th October to 20th November, at $ 0 66 2-3 per day.

J. Tortie, chainman from 27th October to 20th November, at $ 0 66 2-3 per day.

Amberson Williams, axeman from 27th October to 15th November, at $ 0 66 2-3 per day

W. Lefevre, axeman from 27th October to 15th November, at $ 0 66 2-3 per day.

John Mitchell, superintendant, at $ 3 per day.

John Ferguson, engineer, at $ 2,000 per year.

Clerk, $ 2 50 per day.

From the 22d December to the 15th of February the inspection of the line was confided to Mr. Vincent, he being the only person retained during that period. After that and until the 1st of June the party consisted of myself, Mr Vincent, Mr. Torbet, and two chainmen. After the 1st of June, the party was augmented for the purpose of prosecuting the location on the west side of French creek, and the same establishment continued until the 26th July, at which date the location had been completed to Muddy run; or, within about two miles of Conneaut lake. At this point the country presented difficulties which had not been anticipated, rendering it impossible to determine the best site for the feeder until the approaches to the summit had been more accurately examined. These examinations were commenced on the 27th October, and will have been completed in a few days, after which it is intended to retain only Mr. Vincent, one target bearer and one chainman I respectfully suggest to you the propriety of having the rate of Mr. Vincent's compensation settled by an order of the board at as early a period as may be convenient.

am, Sir respectfully
Your ob't serv't.
J. FERGUSON
Engineer.

Meadville, November 16th, 1828.

LIST of contractors with contract prices, for that portion of the French creek feeder west of the creek.

Date of contract	No of section.	Names of Contractors.	Prices for Grubbing	Prices per cubic yard. Excavation.	Embankment.	Rock.	Puddling.	Prices per perch. Outside slope wall.	Inside slope wall per sqr. yd.	
1828										Embank't for which the earth is not found in bed of canal 25 cts
Sept. 2	39	Magaw & Avery,	$200	8	12½&25	38				
	40	Norton & Gehr,	230	8	6¼	50	18¾			14 cents.
	41	Mark Baldwin,	2	8	10	37	14	25	10	
	42	William Crawford,	65	8	11	40	39	1		
	43	Beaty & Custard,	50	8½	12½	48				
	44	Merrington & Perrine,	350	7	10	37½	6¼			
	45	Holmes & Magaw,	80	9	11	40	18	1 50	33	
	46	Samuel Glenn,	50c perp.	8	14	50	6			
	47	John Dickson,	75	8	12	45	14			
8	48	Power & M'Farland,	1	11¼	12½	50				
8	49	Porter & Quigle,	8	10	11	40				
	50	John Gibson,	280	10	18	50	15	2	37½	
	51	James Dickson.	150	8	12	50	10	50		
9	52	Doty & Sears,	2	10	12½	40	18	1 75		
28	53	William M'Fadden,	95	12½	15	37½	25	1 50	57½	
15	54	Magaw & Moore,	575	12	10	45	18¾	1 75	57½	
5	55	David M. Farrelly,	3	10	16	50	16	2	15	
	56	Robinson & Smith,	5	10	12½	50				
5	57	William Gill, jr.	1	10	16	55		2	57½	
3	58	Stickney & Wentworth,	80	9	11	34				
15	59	Magaw & Moore,	4	12	10	45	18¾	1 75	57½	
2	60	Beals & Bainbridge,	550	9	13	50				
	61	Horst, Dill & Horst,	2	12	9	30	12	2		
	62	John Tobin,	4	14		25	10	1 25	12½	
	63	James M. Dickson,	625	10¼	13	37	8	1 37		
	64	Randolph & Odele,	475	11		10	40			
3	65	Joseph Turner,	350	12½						
1	66	Steward & Cadwell,	180	9	18					
9	67	Nathan Hempstead,	125	10	12	57	18	2		
2	68	Henry F. Tammany,	650	12	10	40	10			
12	69	Cummings & Bull,	140	13	15	45				
17	70	Milton Ford,	150	11½	12½					
8	71	*Hosmer Kellogg.*	*160*	*10*	*8*	*50*				
12	72	Cumming & Bull,	125	14		45				
4	73	Gould & Raymond,		9	10	21½				
	74	Randolph & Raodolph,	150	11	15	45				
2	75	Root & Cherry,	2	13		50				
4	76	Randolph & Raodolph,	350	12	15	45				
22	77	John V. Singer,	674	12½						

Arthur and Oscar Cullum, contractors for the aqueduct over French creek. Length of trunk 270 feet, prices as follow :

For bearing piles per foot,	12½
For pile plank 2½ thick, per foot,	8
For square oak timber per foot,	8
For masonry in the abutments and piers, laid with cement per perch,	4 50
In the same without cement, all iron necessary for clamping included,	3 50
For each lineal foot of the trunk, including the horse way and its railing,	7 95

FRENCH CREEK FEEDER.

A list of bridge contracts entered into from the 1st November, 1827, to the 1st November 1828.

Joel Hotchkiss, contractor,	2 farm bridges,	120 each,	240	
Noah Town, do	7 do do	125 do	875	
Elisha Wightman, do	3 do do	120 do	360	
Walker & M'Clokey, do	1 road do		245	
Henry Hurst, (in Meadville)	3 do do	236 do	708	
William Latta, do	2 do do	236 do	472	
Smith & Reynolds,	2 farm do	130 do	260	
do do	1 do do		128	
Samul. Torbet, (in Meadville)	2 road do	240 do	480	
do do do	1 do do	52 do	52	
Albert E. Bull,	1 do do		104 41	
George W. King,	1 do do		240	
Artimus Smith,	1 farm do		125	
George W. Davis,	1 do do		129	
Walker & M'Claskey, Western division,	14 do do	100 do	1400	
Noah Town, Westren division,	3 do do	135 do	705	
			$6528 41	

TABULAR STATEMENT of the progress of the work on the eastern division of the French creek feeder—shewing the amount of work done, payments made to contractors, and per cent. retained, up to and inclusive of the 15th November, 1828.

No. of Sect.	Contractors' names.	Cubic yards. Earth excav.	Canal emb	Bridge emb	Trans pan.	Slate rock	Sand rock.	Outside slope wall.	Inside slope wall	Cost of grub'g	MISCELLANEOUS.	Estimated cost.	Retained.	Paid.	
								perches	perches			D. Cts.			
1	James Brawley	9203	498			3 03	2004			$250	427 cubic yards inside wall at 75 cents	2670 08		2670 08	completed
2	Henry Colt	7 28			7415		3019	1701		220	Making drain under bank $12 50	5539 84	1107 88	4431 56	
3	Alexader Shaw	3370	3157	1073	2359		177			100		1373 88	814 66	1238 72	
	Noah Town										Culvert—materials	135	27	108	
4	Albert E. Bull	5739	7807		3916					120	2 bridges framed	190	38	152	
												2498 74	519 73	2079 01	
											Culvert	393 30	78 66	314 64	
											do	482 53	96 05	386 00	
	Noah Town										Bridge framed	95	19	76	
5	James Dickson	7496	2230		3810		26			150	317 c y excavation (cul pit and drain) at 12 cts	1467		1467	completed
											Extra grubbing $10	485 54	97 10	388 44	
6	Trotter and Freeman	6206	1769	1388	761		293			75	Extra grubbing 4 dollars	1324 68	48 13	1276 55	completed
	Noah Town										Farm bridge	125		125	
7	Ira Avery	5918	12470		547		12			120	372 cubic yds extra excavation (cul pit) at 10 c	3873 47		3873 47	
											Culvert 8 feet chord	553 91	110 78	443 15	completed
8	Arthur Cullum	11826	2 94				12			210	287 cub yards of extra excav (cul pit) at 12 cts	1930 80		1900 80	completed
											Culvert 6 feet chord	460 22		460 22	completed
9	Samuel Harroon	6243	44		1253		424			144	Making drain under bank $9 75	1170 09		1170 09	completed
10	Elliott Harroon	68 7	3264	1917	917		148			105	Cul. pit 30 dollars—extra grubbing 8 dollars—culvert stone $38 10	1476 06		1476 06	
	Noah Town										Culvert 2 feet chord	247 45	49 49	197 96	completed
											Farm bridge	125		125	completed
11	Henry Hurst	7315	842	1774	1307		13			120		1373 74		1373 74	completed
	Noah Town										Farm bridge	125		125	completed
12	Albert E. Bull	1 91	3143	2856	2725		198			190	278 c y extra excavation at 12 cts—200 c y at 15 cts—extra grubbing $44 05	2365 74		2365 74	completed
											Culvert	307 46	61 50	245 96	completed
	Noah Town										Farm bridge	125		125	completed
13	Albert E. Bull	6739	1882	2026	836		2			95	Extra grubbing $20—bridge materials $69 29	1273 09		1273 09	completed
	Artemus Smith										Bridge estimated	115		115	completed
14	Daniel Smith	7860	2376	415	2546		53			110		1617 57		1617 57	completed
	Smith and Reynolds										Bridge	130	2	130	completed
15	David Compton	9305	1815		3102		376			60	Extra grubbing 20 dollars	1853 67	370 65	1482 94	
	John Petree										Culvert materials delivered	90	18	72	
16	M'Claskey and Barr	3549	3514	487	1450		85			25	Extra grubbing $3 50	969 45	193 87	775 58	
	Smith and Reynolds										Culvert	293 53	58 70	234 82	
	Levi Cox										Bridge 130 dolls.—materials delivered $21 17	151 17	2	149 17	
17	Bishop and Cheny	15967	1692	4390	5355		100			100	Extra grubbing, removing timbar &c 25 dollars	3066 53		3064 65	completed
	Noah Town										Culvert 2 feet chord	267 17	53 43	213 74	
18	William Kerr	12118	2893	3296		7106	53				Farm bridge	130		130	
										150	161 cubic yards inside wall at 1 75—184 c y excav cul pit at 12 c—quicksand excavation 36 dollars, removing timber 70 dollars	3151 54	654 43	2497 11	
											Culvert 4 feet chord	553 56		553 56	
	Noah Town										Farm bridge	130		130	
19	M'Claskey and Barr	13357	1673		4046		81			160	Removing heavy timber from road 100 dollars	2688 14	537 62	2160 52	
											Culvert 4 feet chord	414 80	82 96	331 84	
20	John Radle	26485	1029	1137	5903		129			90	Removing timber from road 115 dollars	3447 28	689 44	2757 84	
	John Petree										2 culverts $392 02 and $427 35	760 57	152 07	608 50	
	Joel Hotchkiss										Farm bridge	120		120	
21	James Dickson	15404	5542	3674	5057		133			46	103 c y inside wall at $1 75—181 feet plank at 3 cents, cul under bridge embankment 18 dollars—drain 15 dollars—extra work at bridge landing $23 50	3040 19		3040 19	completed
	Joel Hotchkiss										Farm bridge	150		150	
22	James Dickson	9242	892		4634		402			60	Removing timber from road 4 dollars	2060		2060	completed
23	Mallary, Harris and Co	4756	4756	2032	3603		598			70	Baling water when laying pipes 5 dollars	2126 83		2126 83	completed
	George W. King										Road bridge	248		248	completed
24	Mallary, Harris and Co	7098	625		2212		417			55		1150 94		1150 94	completed
	M'Clasky and Barr										Turnpike bridge $45 dollars—extra work 9	254		254	completed
25	William Latta	4641	1125	2760	1209					50	Extra excav 9 dollars—removing timber from clay pits 15 dollars	944 10	138 82	805 28	
											Turnpike bridge 256 dollars—bridge on South street $114 33	570 33	17 75	552 58	
26	Henry Hurst	8519	1806	3471	532		44			50	173 c y extra excavat'n cul pit at 15 cts—materials for bridges and culvert 300 dollars	1768 17	353 63	1414 54	
											Bridge on Arch street, Meadville	416		416	
											do on Strawberry alley	236		236	
27	Arthur Cullum	5055	292		18981		44	1177			809 perches rubble at 50 cts—removing timber near Magaw's mill, wharves &c $119 50—drains 13	7119 00		7119	
											Small culvert 2 feet chord	540 84		540 84	completed
											Large do 12 do	2111 90		2111 90	completed
	Samuel Torbet										Bridge work estimated	550	100	450	
28	Albert E. Bull	4444			598		1			7	19 cubic yards iron ore at 50 cents—timber for well tall 162 dollars plank 70 dollars, stone delivered 120 perches at 1 dollar	798 36	159 71	638 85	
29	Bull, Shattuck and Magaw	24382	277		2860		53	2006.4		50	1008 perches of rubble stone at 50 cts, $504	7089 66		7089 66	completed
30	Thomas King	6814	868		3041		885			70		1275 75	275 14	1100 59	
	Noah Town										Bridge framed	90	18	72	
31	William Latta	8496	1300		4903		1422			90	Grub'g &c above line 80—removing timber 18	1932 33	536 44½	1545 88	
32	Thomas King	12287	1025		12175		2359	2432		130	223 perches outside wall relaid at 30cts—grubbing above line 90 dollars	8605 98	1721 18½	6881 77	
33	Robert Mead	22561	10				652	702		180	180 perches outside wall relaid at 30cts—removing timber 54 dollars	4807 50	961 49	3846 01	
											Allowance for grubbing and removing timber from bill to prevent slips	60		60	
34	Hugh Brawley	6620	330		10454		2626		1180	190	Grubbing and removing timber extra $102	3887 56		3887 56	completed
35	M'Claskey and Barr	5344		1153	7330		3080			150	Extra grubbing $8	8118 22		8118 22	completed
												105625 14	9505 90	96759 24	

No. 6.

FRENCH CREEK FEEDER.

A list of damage contracts entered into from the 1st November, 1827, up to the 1st of November, 1828.

	Am't. of contracts,	Am't. paid,
Francis Ross, for removeing house and releasing damages,	240 00	
John Birth, for removing fence,	10 00	10 00
John Dickson, for removing house,	85 00	85 00
W. A. V. Magaw, removing building	50 00	50 00
David Campton, for removing buildings,	100 00	100 00
Simon Shoemaker, for removing buildings,	35 00	35 00
Alexander Shaw, removing buildings and releasing damages,	250 00	100 00
John Dickson, damage to lo's,	10 00	10 00
Nelson Smith, for making road,	84 76	84 76
James F. Randolph, removing buildings and releasing damages,	660 00	260 00
John Patterson, removing house and making road	57 50	50 00
Taylor Randolph, removing barn,	20 00	20 00
Lot Lewis, securing stable from injury by the canal,	1 50	1 50
W. Shearman, repairing road,	2 50	2 50
Henry Boal, do do	5 00	5 00
William M'Clure, removing fence,	5 00	5 00
Richard Dennis, for copper pipes to convey water to tanyard,	57 81	57 81
John D. Gibson, a house and lot purch a now the property of the state,	450 00	450 00
John Reynolds, a lot do do	100 00	100 00
Abraham Sarber, removing two houses,	74 56	74 56
Henry Boal, for making turnpike road,	850 00	850 00
Henry Krowl, for making road,	713 04	713 04
John Patterson, for removing bridge and making road,	20 00	
John Looper, lot purchased, now the property of the state,	200 00	200 00
Artimus Smith, removing fence,	8 00	8 00
John Crosby, removing barn,	5 00	5 00
Joseph E. Holmes, clearing a site for bridge,	5 00	5 00
Lewis Morton, do do	4 00	4 00
Amos Pearson, damage to garden,	8 00	8 00
Robert Mead, removing fence,	8 00	8 00
Levi L. Morris, removing shop,	28 00	28 00
R. Patch, removing house,	10 00	10 00
Anna Derickson, removing fence, &c.	12 00	12 00

Timothy Alden, removing fence,	5 00	5 00
J. C. T. M'Clelland, damage to lot,	6 00	6 00
S. B. Martindale, removing fence,	2 00	2 00
William Latta, building bridge,	3 00	3 00
Abraham Sarber, removing fence,	5 23	5 25
Daniel Perkins, removing house	20 00	20 00
Daniel Bemis, a road contract, and bond to the commonwealth to keep the state clear of future damage,	750 00	
Damages assessed, none.		

Series 3.

No. 1.

Report of James Clark, acting commissioner on the Juniata division.

JUNIATA CANAL OFFICE,
Lewistown, December 5, 1828.

To the board of canal commissioners.

GENTLEMEN,

Although at the date of the report which I had the honor of submitting to the board on the twenty fourth day of November, 1827, there was but the small sum of twenty-two thousand two hundred and sixty-two dollars and fifty-eight cents paid to contractors for work done on forty four and a half miles canal. Yet in conclusion, an opinion was risked that this canal would "be ready for the reception of boats early in the spring of 1829." This hope would have been realized if the character of the Juniata had stood as fair for health as other parts of the state. But a great degree of sickness along the canal line, and among the citizens of the neighborhood during the last summer and autumn together with the exagerated reports of the sickness abroad, produced, as a necessary consequence such a scarcity of laborers, as to paralize the efforts of the most energetic contractors, and to postpone the hope of a final completion for a few months beyond the period that had been anticipated.

When the contractors began their operations in the fall of 1827, the wages of labour ranged from eleven to twelve dollars per month. But the prospect of such a large additional quantity of canal being thrown into market as was authorized by the law of last winter, together with the character of the Juniata climate, caused the wages of labourers to advance early last spring, and to continue throughout the summer and autumn from sixteen to eighteen dollars a month, and in addition to which the contractor—beside finding his hands in tools, drink and boarding—had to be at the risk of the precariousnes of the weather. Such an occurrence induced many of the original contractors to abandon their jobs, and the

work had to be re-let at prices corresponding with the charge of circumstances.

Four sections have been added to this division of the canal, so as to extend it up to the outlet lock at Lewistown, and down to the Susquehanna division on Duncan's island. A view of the persons to whom, and the prices at which they have been let, together with the sections which have been re-let since the date of my last report are given in table A. By this table it appears that of ninety-five sections in which the canal is divided, thirty-seven have been re-let, and of these, seven have been sold thrice, and one of those has a fourth time changed contractors.

Table B. will exhibit the changes that have taken place in the incidental work. The failures to prosecute the contracts for the stone and wood work along the line had become so numerous that it was deemed necessary to re-let the abandoned jobs by public sale, which was done on the thirteenth day of May last. And thereby an open competition was invited which produced its necessary effect that of securing the completion of the work on as favourable terms as the change in the price of labour would warrant.

A comprehensive view of the present condition of the line is given in table C. and D, in which the whole quantity of work done—its cost—and the amount of money paid are shown. By these tables it appears that the aggregate of the engineer's estimates for work done amounts to five hundred and forty-five thousand, four hundred and eighty-eight dollars and thirty-three and a half cents. And that the money which has been paid on these estimates is four hundred and thirty-five thousand three hundred and seventy-five dollars, and twenty-nine and a half cents. Leaving one hundred and ten thousand one hundred and thirteen dollars and four cents of retained per centage, as a security for the completion of the contracts.

By the estimate of Col. Clinton the engineer, there appears to be three hundred and fifteen thousand, six hundred and forty dollars worth of work yet to be done on this division of canal.

Notwithstanding the complicated and embarrassing difficulties which have had to be encountered, the progress of the canal has been unremitted, and its final completion in the early part of next summer made almost as certain as any future event can be, which depends upon human exertion. The only part of the work which it is feared may retard the junction of the water of the Juniata and Susquehanna canals by mid summer, is the aqueduct over the Juniata river at the head of Duncan's island, but as it is in the hands of contractors who are believed to be energetic and persevering, it is hoped that the completion of the contract will not be delayed beyond the day specified in their agreement.

Two substantial dams, of eight feet high each, have been erected in the river, one at Forth's island, and the other at the head of the Long narrows. And in obedience to the law which requires the natural navigation to be left unimpeded, a cheap crib lock has

been erected at each dam, seventeen feet wide, and ninety feet long within the chamber thus not only making the natural navigation of the river equally safe, but much more easy than it has heretofore been at those places.

The original determination of prohibiting all buying and selling or re-letting and subcontracting of jobs, has been rigidly adhered to, and the personal attendance of the contractor on the work, but rarely dispensed with. The engineers have been constantly at their posts, and assiduously engaged in their duties. While the rights of the citizens in the vicinity of the canal, have been scrupulously regarded, thus by preventing, colisions between the contractors and land owners numerous claims for damages have also been prevented, claims which no doubt arise oftener, from vexatious provocations, than from any real injury done to property.

The accounting officers have decided that the removal of buildings from the canal line, even when done by contractors, shall be classed as damages. Independent of this kind of expense, there has been but six dollars paid for damages on the whole Juniata division previous to the first of the present month, and that was for the destruction of a small field of wheat. But including all that is called damages the amount paid has been one hundred and eighty two dollars.

The damages which may ultimately have to be paid is uncertain, It is however believed that the amount will not be great, as the citizens residing along the Juniata river have not only forborn making vexatious claims for damages, but their laudable public spirit has shown itself, in giving every facility in their power to the canal operations.

The new line of canal extending forty-five miles (from Lewistown to Huntingdon) was laid off into ninety sections and sold on the fifteenth day of October. And the stone and wood work was sold on the nineteenth day of November last. At these lettings the competition was so great as to give assurance that the jobs were taken on favourable terms for the commonwealth. In general however the prices asked for work are higher than similar work was let last year. With a view of keeping the whole force at disposal, concentrated on the old line below Lewistown the sales of the new line were deferred until late in the fall, and with the same view as well as to avoid as much as possible giving any cause of embarrassment to the treasury no estimate has been promised to the contractors before the fifteenth day of next January.

Another precaution which was adopted is the prohibition of contractors on the old line from commencing the new jobs assigned them until their old contracts shall be completed. hence their is as yet but little work done above Lewistown, and no money has been paid. The contractors are generally however building their *shantees*, clearing their ground, and making other preparations for an active prosecution of the work.

A list of the persons to whom the sections on this line have been assigned with the prices for each item of work, are given in table E. And a similar list of those who obtained the incidental work is given in table F. The waste wiers, lock houses and fences, have not been sold, it being deemed soon enough, eighteen months hence to erect the lock houses, and the construction of the fences, on the whole Juniata division is uniformly offered to the land owners at fixed prices. There will be on this new line of canal much difficult and expensive work. The aggregate estimate of the engineer, predicated upon the contract prices for the whole line, being eight hundred and ninety thousand two hundred and twenty-nine dollars.

Table G. gives the names, station, and compensation of every person who has been employed in the engineer corps and in the canal office since my last report. By which it appears that there has been sixteen thousand eight hundred and forty-three dollars and fifty cents paid for superintendance, clerk and engineer wages within the last year. The present organization of the engineer corps, as shown in table H is believed to combine as much skill and vigilence, efficiency and economy as can be had in works of such magnitude.

The whole disbursements at the Juniata canal office, for every thing since the commencement of the work to the present time is four hundred and fifty seven thousand nine hundred and fifty-three dollars and twenty-five cents.

The great progress that has been made in constructing the canal below Lewistown under so many discouraging circumstances is owing chiefly to the energy and perseverance of as worthy contractors as any canal line can produce and to the unwearied diligence of the corps of engineers and the clerk to the canal office.

Respectfully submitted,

JAMES CLARK,

Acting Commissioner.

No. 2.

Report of Dewitt Clinton, Engineer, upon the situation and progress of the Juniata division, (lower line) from the mouth of Junitata to Lewistown.

ENGINEER DEPARTMENT,

Lewistown, Dec. 1st, 1828.

To the honourable board of Pennsylvania Canal Commissioners.

GENTLEMEN:

I have the honour to submit the following report, on the situation of the works on the Lewistown division of the Juniata Canal.

The works remaining to be completed will amount to $315,646, of which $152,694, comprises the excavation, embankment, walling, &c. and the balance the mechanical parts of the work.

The certificates that have been issued in favour of the contracters by the Engineer Department, amount to $545,488, out of which there has been $9,849 forfeited to the state on account of sections having been abandoned. The value of the certificates added to the sum necessary to complete the canal, makes an aggregate expense of $851,279.

The estimate in November, 1827, amounted to $597,775, and the estimate for the continuance of the canal at Duncan's island to $58 758. There is to be added a further sum of $75,883, for works which were not included in the former estimate, viz.—Pier head at Lewistown, sections O and X, public and farm bridges, culverts, rope ferry, lock-houses, county and turnpike roads—and the alteration of 42 feet of lockage from wood to stone, this makes $732,410, and falls short by $118,853, of what will be the actual cost of the works. This deficiency in the original estimate is owing to the increased prices of the contracts—(as the estimate was predicated on the contract and assigned prices,) and the excavation has been more difficult than expected. Although in this last case it has increased the expense, in the end it must result to the benefit of the state, as the canal when completed will be constructed of the most durable materials.

The locks on the line were originally contracted to be constructed of wood and stone combined; but the increased price of labour and timber prevented the original contractors from carrying them on, and the hopes of a speedy completion if they were changed to stone laid in cement, induced me to alter seven locks on that construction. They are all now under way, and will be completed early in the spring.

The two feeder dams are completed, and the river locks connected with them—which are 90 feet long and 17 feet wide.

The culverts are principally done, and the small aqueducts are very forward—the cast-iron and cut-stone, for the Big Buffaloe aqueduct are all delivered, and the combined aqueduct and lock at Mexico, will be completed early in the spring. The aqueduct over the Juniata is not as forward as could have been wished, but as the foundations for the piers and abutments are all laid, and as the contractors have made all their arrangements, and are energetic men, a failure of that work cannot reasonably be expected.

The mechanical work which remains on the Juniata, is of such a description as generally to allow of its being constructed this winter, and if we have a continuance of good weather, the navigation from Lewistown down will be opened early in July next.

The progress of the Juniata canal has been as rapid as the discouraging epidemic of the autumn, and the high wages of the labourers would allow. The style and rapidity of the work, is to be attributed to the indefatigable exertions of the gentlemen connect-

ed with the engineer department; and I cannot refrain from publicly manifesting my approbation of their continued and indefatigable exertions, under so many discouraging circumstances.

Respectfully submitted,

DEWITT CLINTON,

Engineer.

No. 8.

Report of Dewitt Clinton, Engineer, on the upper line of the Juniata Division, from Lewistown to Smith's mills above Huntingdon.

To the honorable board of Pennsylvania canal commissioners.

GENTLEMEN,

Appended to this report is a careful estimate of the Juniata canal between Lewistown and Huntingdon, predicated on the contract and assigned prices for the works. The cost of the canal at the estimate amounts to $890,229, which includes the feeders, dams, aqueducts and river improvements.

To arrive at the different classes of excavation, the number of yards in the sections is proportioned to the degree of hardness, or easiness of the digging ascertained from examining the ground with an auger.

Some of the sections on the final estimate may amount to more or fall short of the estimate. But it is believed that in the aggregate that the canal will not exceed the estimated cost.

As we experienced much difficulty in procuring water cement on the Lewistown section of the canal, and as the mineral is of a poor quality, I have considered it best to suspend its use and to depend in all cases on common lime, mixed with pure siliceous sand, and protected by thick coats of puddle.

The temptation which culverts with high side walls of masonry, and the ease with which unfaithful mechanics may make bad work in them without being detected, has induced me to abandon them in all cases on the upper line, and to make the arch of a sufficient caliber to discharge by springing from the wood or rock bottoms of the culverts all the water of the streams.

The expense that would attend the embankments of bridges in the borough of Huntingdon, has induced me to adopt at that place swing bridges, and as they are to be constructed on a plan different from those in use, I have annexed a description of them.

The river aqueduct at Jack's narrows has four arches of 72 feet span; the other at Shaver's ford has five arches of 75 feet span.—The trunks are supported by wooden arches similar to the western aqueducts, but having iron rods running from the ribs to the floor plate, to equalize the pressure on the chords, and introducing counter or cross braces in the sides of the trunk, and placing it at

equal distances between the ribs. The expense of the aqueducts will amount to $63,800. At the Raystown feeder dam, a chute is planned to accommodate the river trade; it is two hundred feet long, and the fall is ten and a half feet, which is distributed in such a manner as to give unequal velocities in passing over it. The foremost part of the craft in descending will be slightly depressed in the first fifty feet, and elevated gradually on leaving it.

The plan for the work is for the aqueducts and public bridges, wood superstructures, supported on walls of dry masonry, trussel farm bridges, culverts of stone laid in common lime, waste wiers of dry and morted walls, and locks of combined dry masonry and stone, for a description of which I refer to the annexed specification.

The work is generally commenced and the contractors are making arrangements to carry on their work with vigour.

DEWITT CLINTON,
Engineer.

Engineer Department,
Lewistown, December 1828.

SPECIFICATION

For a swing bridge at Huntingdon, on the Huntingdon Division of the Juniata Canal.

The main support of this bridge will be an abutment in the canal four feet from the centre line towards the berm side. This abutment will be commenced four feet below bottom, ten feet broad and twenty six feet long, to be built six feet high, and to be on top eight feet broad by eighteen long; the stones to be of a large size well shaped, and laid in cement in the strongest manner. Bedded into the top is an iron plate four inches thick and six feet in diameter, with a perforation in the centre, for the pivot of the bridge. This pivot will be of wrought iron 5½ feet long, six inches in diameter next to the bridge and sloping to three inches at the end where it rests in an iron box let into the masonry; at the top it is joined to an iron plate which is connected with the main timbers of the bridge with screw nuts and bolts. To assist the bridge in swinging, perforated balls are to roll between the plates, and are themselves to be kept apart by two thin iron rings connecting small rods which pass through their perforation. The bridge towards either extremity is sustained upon two wheels two feet in diameter, which roll along on the pavements or planked way on the bottom, in a circle of thirty feet.

The bridge itself will be forty-four feet in length, and when in a proper position for crossing, will rest at both ends upon a step two feet deep in the tow-path and berm abutments, of which the breadth on the face, will be eight feet, that of the bridge being the same from outside to outside.

Report of William Wilson, Superintendent on the eastern division Pennsylvania canal.

To the President and Board of Pennsylvania canal commissioners.

GENTLEMEN,

I beg leave to present to you my report upon the several works confided to my care from the 21st June 1828, being the time I took charge of the eastern division of Pennsylvania canal.

The first paper to which I beg leave to refer, are the lists of contracts on said division marked A. 1. and A. 2.—A. 1. contains all the contracts entered into from the 21st June to 3d November, 1828, as required by the the "Act of 16th April, 1827. And A. 2. embraces all the contracts intered into for the letting on the first of November 1828, from the Swatara to Columbia, as those lists contain all the information I can give on the subject, I leave them without further remark.

The next I refer you to, is the list of engineers and persons employed on said division from the 21st June, to 3d November 1828, marked B.

The next in order is a statement of damages marked C. With reference to this I will observe that at the time which this report was required to be made, I had only been able to enter into two contracts as will appear by said list. The difference of opinion as to the value of the lands occupied by the canal, and the amount of damages otherwise sustained, have tendered extremely difficult to enter into any amicable arrangements; and the large amount of damages awarded by juries in most cases when that mode of decision was resorted to, have had a tendency to lessen the disposition for amicable adjustment. Two cases of damages have been acted upon by the juries, one in which the heirs of William Maclay were parties and the other Archibald M'Allister. The court have likewise confirmed the award of the jury in the case of George Fisher, for his farm near to Middletown.

I next beg leave to refer you to a statement of the progress of the work on said division from the 21st June to 30th November, 1828, marked D. by which it will appear that the whole amount of work estimated as done during the above mentioned period, amounts to $171,531 53¼

Payments made on the above, amount to $152,575 22

And per centage retained until completion 18,956 31¼

$171,531 53¼

The whole work upon this division is not yet finished, but it is confidently believed will be in the course of the winter, so as to be ready for the opening of the spring navigation. The whole line from Middletown to A. M'Allisters, is finished and ready to let in the water. The only work remaining to be done, is on sections No. 1, 2, 8, and 9. The two first were only contracted for in

the fall of 1827, the guard lock No. 1, section No. 5, and the filling in of the abutments of the two aqueducts at Clark's and Stoney creek, all of which are in a state of forwardness, and without some unavoidable occurrence will soon be completed.

The necessary repairs along the line, consisting of weirs, stopping leaks, sheet piling, planking and puddling at the head of the locks, slope walls, paving and altering the towing path at the borough of Harrisburg, as directed by the board at their last meeting, have been principally completed, although there is little doubt but the water when introduced will point out defects which the most careful scrutiny would not detect and will require additional attention.

All which I beg leave to submit, and am very
Respectfully yours, &c.
WM. WILSON, *Sup't.*

Pennsylvania Canal Office.
Harrisburg, 6th December, 1828.

No. 2.

To WILLIAM WILSON, *Superintendant of the Eastern Division, Pennsylvania Canal.*

SIR—

In compliance with instructions received from Joseph M'Ilvaine, Esq. I beg leave to submit the following preliminary remarks, relative to the line from the Swatara to the Juniata, with the several estimates directed to be furnished.

The new contracts entered into, embracing the guard lock, Clark's and Stoney creek aqueducts with Messrs. Byrne and Co. have been satisfactorily prosecuted and conducted. Although the price now given is much greater than in the original contract, I am satisfied, that had not such measures been entered into, the work would yet be in an extremely backward state.

The old contracts, including the channel, dam and section 2, under Messrs. Green and Moore, and sections 1 and 3, with O. H. Dibble, have also been satisfactorily prosecuted. The dam and section 3 have been completed, and all that remain unfinished comprise sections 1, 2, 8 and 9, with the exception of some items of embankment and excavation at the ends of locks and aqueducts, and part of the coping of lock on section 4, which are of but minor importance.

The alteration of the towing path at Harrisburg is completed—the outlet locks at Middletown are finished, and so soon as the grouting in the bottom of the upper lock will warrant letting in the water, (in becoming sufficiently hard, which will be in week or ten days) the means of communication with the Swatara, will be complete. An energy has been manifested in carrying on the works

highly satisfactory, and the exertions used in every way, to complete the line, are creditable to the contractors—and I can now congratulate you on the certainty with which we may rely on completing this division early in the season of 1829.

SAMUEL H. KNEASS,
Engineer.

Pennsylvania Canal Office,
Harrisburg, 3d Dec. 1828.

Estimate of the cost of completing the division, including finished work, upon which final payment has not been made.

Section No. 1.

1300 perches of wall at 75 cents	$ 900	
6900 cubic yards of embankment at 30 cents	2070	
New road on the above section.		
3000 perches of wall at $ 1 50	4500	
8600 cubic yards of embankment at 30 cents	2580	
		$ 10,050

Section No. 2.

2300 perches of wall at $ 1	2300	
10,176 cubic yards of embankment at 33 cents	3358	
New road on the above section.		
6000 perches of wall at $1 50	9000	
12,500 cubic yards of embankment at 33 cents	4125	
		$18,783
Guard lock		10,000
Section No. 4		900
Sections 8 and 9		7,000
Clarke's creek aqueduct		4,500
Stoney creek do		4,000
Sections 14 and 15		10,000
Lock on section 4		4,000
Total		$69,233

Estimate of the cost of the line from Middletown to Columbia, at contract prices.

Section No. 3.

12,000 cubic yards of excavation at 9½ cents	$ 1140	
3000 do Rock do 43 do	1290	
Grubbing	100	$ 2530

Seeton No. 4.

13,000 cubic yards of excavation at 9 cents	$ 1224	
2500 do Rock do 54 do	1350	
Grubbing	100	
		$ 2672

Section No 5.

10,771 perches of wall at 45 cents		$ 4850	
6000 cubic yards of rock excavation at	50	3000	
4771 perches to provide for wall	50	2385	
20.000 cubic yards of embankment	18	3000	
14,000 do earth excavation	10	1400	
			$15,231

Section No 6.

7608 perches of wall at 50 cents		$ 3803	
7608 cubic yards rock excavation	50	3803	
16,000 do embankment	20	3200	
7500 do. earth excavation	12	900	
			$11,706

Section No. 7.

4608 perches of wall at 48 cents		$ 2211	
4608 cubic yards rock excavation	50	2304	
9000 do embankment	21	1890	
4800 do earth excavation	11	528	
			$ 6933

Section No. 8.

10,771 perches of wall at 47 cents		$ 5062	
4000 cubic yards of rock excavation at	43	1720	
6771 perches to provide for wall	37½	2539	
18,000 cubic yards of embankment	13	2430	
11,000 do earth excavation	9	990	
			$12,741

Section No. 9.

10.000 perches of wall at 62½ cents		$ 6312	
3000 cubic yards of rock excavation	62	1875	
7100 perches to provide for wall	40	2850	
15,000 cubic yards of embankment	25	3750	
16,000 do earth excavation	12	2000	
Grubbing		150	
			$16,927

Section No. 10.

7000 cubic yards rock excavation at	62 cents	$ 4375	
3800 do embankment	25	950	
10,300 do earth excavation	13	1339	
Grubbing		150	
			6814

Section No. 11.

8000 cubic yards earth excavation at	11	$ 880	
6000 do rock do	50	3000	
2500 do embankment.	15	375	
Grubbing		150	
			4405

Section No. 12.

15,000 cubic yards earth excavation at 10 cents		$1500	
Grubbing		100	
			1600

Section No. 13.

15,500 cubic yards earth excavation at 10		$ 1500	
Grubbing		30	
			1530

Section No. 14.

11,700 cubic yards earth excavation at 12½		$1462	

Section No. 15.

1300 perches of wall at	37½ cents	$ 487	
1800 cubic rock excavation	50	900	
15,000 do earth do	10	1500	
6000 do embankment	14	840	
			3727

Section No. 16.

10,137 perches of wall at	50	$ 5068	
10,137 cubic yards rock excavation	45	4561	
19,000 do embankment	15	2859	
4000 do earth excavation	12½	500	
			12,988

Section No. 17.

7764 perches of wall at 55 cents		$4270	
3700 cubic yards rock excavation	50	1850	
4964 perches to provide for wall	45	1828	
10,000 cubic yards earth excavation	10	1000	
12,000 do embankment	13	1560	
			10,500

Section No. 18.

12,000 perches of wall at 62½ cents		$ 7500	
3000 cubic yards rock excavation at	62½	1875	
9000 perches to provide for wall	40	3600	
25,000 cubic yards of embankment	20	5000	
			17,975

Section No. 35.

25,000 perches of wall at	50	$ 12,500	
9000 cubic yards of rock excavation	50	4500	
13,000 perches to provide for wall	50	6500	
50,000 cubic yards of embankment	20	10,000	
10,000 do earth excavation	10	1000	
			34,500

Section No. 36.

28,000 perches of wall at	48	$ 13,440	
3000 cubic yards of rock excavation	55	3650	
22,000 perches providing for wall	50	11,000	
3000 cubic yards earth excavation	10	300	
57,000 do embankment	25	14,250	
			42,690

Conewago aqueduct		3,687
Conoy do		2,200
Chicquesalunga do		2,150
Culvert No. 1		300
do No. 2		450
Bridge No. 1		500
do 2		475
Lock No. 1		2490
do 2, 3, 4, 5, 6, 7, 8,	3,100	21,7000
Total		$240,885

No estimate has been made on either of the above sections, for any kind of earth excavation but loam, as it is impossible even to make an approximation to the quantities, under the same circumstances this estimate has been made. If such material should be met with, the cost of the line will be somewhat increased.

I would respectfully suggest, sir, that the building of stone locks be recommended in your report to the commissioners. Offers have been made by responsible contractors, to build the whole of the locks of stone, with wooden bottoms at an average cost of 5,500 dollars each; which, in the aggregate, will exceed the cost of wooden locks as contracted for, but 17,800 dollars.

Yours, very respectfully,

SAMUEL H. KNEASS,

Engineer.

Pennsylvania Canal Office,
Harrisburg, 3d Dec. 1828.

No. 8.

EASTERN DIVISION, NO. 2.

Statement of the amount of damages agreed to be paid to individuals, or assessed in favor of individuals, against the state on the Eastern Division of the Pennsylvania canal, from the 1st Monday in November, 1827, until the 20th day of June, 1828, when I relinquished the charge of said division as acting commissioner.

1827.

Dec. 27. To Thomas Elder, attorney for Christian Gross, on section 10, inclusive of cost—(reported as assessed in statement of November 5th, 1827) 698 50

1828.

March 6. To W. Grimshaw for clearing stone spalls off his meadow lot, used by the builders of lock No. 6, and for re-setting and repairing a fence. 5 00

8. To W. Holbrook, justice of the peace, for taking sundry depositions in the case of George Fisher for damages 2 71

Conewago aqueduct		3,687
Conoy do		2,200
Chicquesalunga do		2,150
Culvert No. 1		300
do No. 2		450
Bridge No. 1		500
do 2		475
Lock No. 1		2490
do 2, 3, 4, 5, 6, 7, 8,	8,100	21,7000
Total		$240,885

No estimate has been made on either of the above sections, for any kind of earth excavation but loam, as it is impossible even to make an approximation to the quantities, under the same circumstances this estimate has been made. If such material should be met with, the cost of the line will be somewhat increased.

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Yours, very respectfully,

SAMUEL H. KNEASS,

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Pennsylvania Canal Office,
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TABULAR STATEMENT of work done on the Eastern Division of the Pennsylvania Canal, from Duncan's island to the mouth of Swatara, showing each kind of work done, amount thereof, and payments made thereon to contractors, by CHARLES MOWRY, Acting Commissioner, on estimates of the engineer, from December 1st, 1827, up to and inclusive of the 20th day of June, 1828.

No. of section.		Names of Contractors.	Cubic yards. Earth.	Rock.	Slate.	Embankment	Perches wall	Miscellaneous.	Cost of work estimated as done	Retained until completion.	Payments made
									Dolls cts	Dolls cts	Dolls cts
1	Dam	A. Green and W. Cameron					684		3377 25	343 79	2934 46
	Guard lock	O. H. Dibble						Materials	2250	450	1800
2	Canal	Green and Cameron				6981			2303 73	189 43	2114 30
3	Canal	O. H. Dibble	4000	360		7382	6139		7165 34	558 27	6607 07
4	Canal	Jonathan Leslie	9276	92					1170 50	234 10	936 40
5	Canal	Anderson, M'Namee and Co.	7240	50					1093 60		1093 60
								Back per centage			684 43
	Lock No. 1,	Isaac M'Cord						Materials	3419	261 59	3155 41
7	Canal	O. H. Dibble	12 20	550		3170			1610 85	80 54	1530 31
	Bridge No 6	do				1044			146 16		146 16
11	Flood walls	Peter Miller	95			420	90		151 25		151 25
13	Lock No 2,	Hodge and Guy				2458	500		2339 46	118 45	2421 01
14, 15	Canal	Beaumont and Co.	20130	7033		1 498	12 0		14794 92	739 73	14055 19
	Bridge No 5	M'Cord, Beaumont and Canfield					6934		551 20	110 24	440 96
16	Canal	Corbett and Hays	713	25		704	190	Wood work $99	189 49		189 49
											200
	Aqueduct	Jacob Updegrove									
								Back per centage			
								500 feet railing 215 60			
								Painting 39 50			
		James M'Intyre	428					Lead 5 98	261 08		261 08
		do						Grubbing $12	183 20		183 20
		Philip L. Hays				493		Fenders and piling	85		85
									123 25		123 25
	Drain	James M'Intyre						Back per centage	11		11
	Bridge No 6	Wilson Hames						11 days work	12		12
	Culvert	George Shott						Tow path wall	60		60
		Archibald M'Allister						Jobs	196 04		196 04
								Work and materials			60 80
	Bridge No 7	Beaumont, M'Cord and Canfield						In advance	178 20		178 20
		Philip L. Hays				817		Wood work	204 23		204 23
17	Sluice & cul.	Jacob Updegrove							62 88		62 88
		James M'Intyre				471		Work and materials	70 65		70 65
18, 19	Sundry jobs	Robert Williams							270		270
28	Canal	L. Hodge	1511	200		1038			375 66		375 66
		Jacob Emrich					450		67 50		67 50
	Lock No 3.	Hodge and Guy				3757		Gates and stone work	1169 19		1169 19
		Jacob Updegrove						Back per centage			42 07
19	Culvert	R. Williams	200					Painting gates	42		42
20	Canal	do	3750	444		1020			148 80		148 80
			1850	290		300					
	Culvert	C. Carson					123		1472 40	114	1358 40
21	Bridge No 22	M'Cord, Beaumont and Canfield					155	Wooden bottom	378 25		378 25
21	Canal	U. Wickware	1500	150		600			310		310
								U. Wickware	423	44 40	378 60
								Back per centage			240 40
22	Canal	M'Laughlin and Bradley						Grubbing $150	150		150
								do			4 35
23	Bridge No 13	Thomas English							8		8
	do 15,	do						Additional string pieces	8		8
24	Foot bridge	do						Wood work	45		45
	Bridge No 16	do						do	8		8
25, 26	Canal	Beaumont and Co.	1800	100	964			do			
								Grubbing $67	514 09		514 09
	Bridge No 17	Thomas English									1173 91
		Beaumont and Co.						Wood work	8		8
	Bridge No 18	do			203				40 60		87 04
											47 60
		Thomas English						Back per centage	8		8
	Bridge over							Wood work			
	Paxton creek	do							56 50		56 50
27	Bridge No 19	do						do $75 and $8	83		83
									15		15
	Jobbing	Joseph Williams						Painting	2		2
	Bridge No 20	do						Wood work	8		8
28	Lock No 4	Wm. Byrne & A. & J. Provest						Gates and sheet piling	492	50	442
								Back per centage			574 15
		L. Clancey						Iron work	7 50		7 50
29, 30, 31	Sundry jobs	George Shott							949 96		949 96
29	Lock No 5	Thomas English						Piling and painting gates	48		48
		Jonathan Leslie						Wood work of gates	300	15	285
	Fences	John Ritchey							38 08		38 08
	Bridge No 21	Thomas and R. English						Wood work	75		75
		Thomas English						Resting 168 feet $109 20			
								Painting 15 00			
	Bridge No 22	do						Additional string pieces 8 00	132		132
30	do 23	do						do	8		8
	do 24	do						do	8		8
	Culvert	Joseph Black						do $8 00			
31	Aqueduct							Railing 65 00	73		73
	Canal	Bracket, Watson and Bowen				2136		Piling and planking	18		18
									373 18		373 18
	Jobs	Samuel Holman						Back per centage			450 28
32	Canal	Beaumont and Co.	50			2423			111 21		111 21
	Lock No 6	Thomas English							540 76		540 76
	Culvert	M. Holman						Oiling and painting gates	48		48
	Bridge No 25	Thomas English						275 superficial yards of paving	275		275
								Wood work	8		8

No. of sections		Names of contractors.	Cubic Yards. Earth.	Clay.	Rock.	Slate.	Embankment.	Wall	Grub'g	Miscellaneous.	Cost of work, estimated as done.	Retained until completion.	Payments made.
											Dolls cts		Dolls cts
33	Bridge No 26	Thomas English								Wood work	8		8
		M. Holman					130	32			90		90
	Bridge No 27	Thomas English								Back per centage			34 60
		M. Holman					756	17		Wood work	8		8
											135 20		135 20
54	Bridge No 28	Thomas English								Back per centage			16 50
		M. Holman					299	24		Wood work	8		8
											122 75		122 75
55	Canal	Hodge and Johnson	1866		34		2164		40 66	Back per centage			32 50
											229 41		239 41
	Culvert	Hodge and Guy								Back per centage			331 53
										Work and materials	204		204
		Philip Darmody								Back per centage			6 37
	Bridge No 29	Thomas English								do	8		8
		Philip Darmody								Wood work			18
	Bridge No 30	do								On embankment	8 27		8 27
	Turnpike	Michael Holman								Wood work	8		8
56, 57	Bridge No 31	do					1051			107 perches lineal	856		856
	Drain	do						43			262 75		262 75
		Thomas English									90		90
		do								Wood work	83		83
57	Canal	Beaumont & Co.	311	1500			9365	2413		Painting	13		13
											2869 70		2869 70
		Michael Holman								Back percentage			76 36
	B. at Nisley's	do						80		Work at Nisley's spring house	315 60		315 60
	Culvert	Beaumont & Co.						39		$100 Back per cent. $3 50	160		163 50
	do	Michael Holman									107 25		107 25
58	Bridge No 32	do					350			Pud. 82 50 b. per cent. 15 64	82 50		98 04
		Thomas English					379				56 85		56 85
59	do 33	do								Wood work	8		8
	do 34	do								do	8		8
55 to 40	do 28 to 55	George W. Sanford								do	8		8
										Stone work and materials	290 52		290 52
41 to 47	do 36 to 44	Samuel Hopkins								Back per centage			99 47
40	Aqueduct	Hodge and Guy								Stone work and materials	1382 80		1254
											249	128 80	249
	Bridge No 35	M. Malone					496			Back per centage			271 87
		Alexander Groves.									64 48		64 48
		Thomas English						60			60	3	57
41	Canal	Beaumont & Co.	543		35	785				Wood work	8		8
		John Marshall									173 59		173 59
	Bridge No 36	Thomas English								Back per centage			361 10
										Ditching	3		3
	do 37	do								Additional string pieces $8			
										Railing $65—painting $8	88		88
42	Culvert	Samuel Hopkins								Additional string pieces $8			
								16		Painting 10	18		18
43	Bridge No 37	C. O'Donnell									44		44
		Thomas English					206			Back per centage			12 38
44	Canal	L. Hodge	725				525		33 33		30 90		30 90
										Additional string pieces $8			
45	do	Midler & Co.	1293		705				20 00	Painting 10	18		18
	Waste weir									Back per centage	176 70		176 70
		Thomas Elliott									501 80		357 13
	Bridge No 39	L. Hodge					861			Back per centage.		44	437 80
											24		167 92
		Thomas English									116 23		24
										Back per centage			116 23
										Additional string pieces $8			16 20
	do 40	Midler & Co.					2500			Painting 10	18		18
		Thomas English									600		300
										Additional string pieces $8			
										Railing $65			
										Painting 15	88		88
	Turnpike	Richard Howgan								Materials and work	287 50	57 50	230
46	Bridge No 41	do								Additional string pieces $8			
										Painting 10	18		18
	do 42	do								do 6 do	18		18
47	Canal & basin	Mathew J. Roark								Sundry jobs	280 89		280 89
	Basin	Beaumont & Co.	400				379				89 87	17 97	71 90
		Joseph Brestel								Plank	8 32		8 32
	Regul. lock	Beaumont & Co.								Gates	309 50	50	259
	Out-let locks	M. J. Roark								Bailing and pumping water	218 50		218 50
		Beaumont & Co.								Materials	1727 97		1727 97
										Back per centage			65 41
	Junction with										650 50		650 50
	Union Canal	M. J. Roark	4055				3261						
	Bridge No 43	Thomas English								Additional string pieces $8			
										Painting 10	18		18
	do 44	do								Additional string pieces	8		8
		M. J. Roark					1395	158		Coping 114 feet	1202 50	1	1206 50
		Thomas Elliott								Wood work, painting and lead	224		224
Lower part of the line,		Michael Holman								Sundry jobs	664 56		664 56
	Fences	Isaac M'Cord									685 35	85 35	600
	Cast iron	J. S. Weistling									775 97	125 97	650
	Wrought iron	Joel Bailey									265 55		265 55
											67,814 96	3625 83	70,417 07

Pennsylvania Canal Office, Harrisburg December 5, 1828.

C. MOWRY, Acting Canal Commissioner.

C. MOWRY. Acting Canal Commissioner.

STATEMENT of the progress of the work on the Eastern Division of the Pennsylvania Canal, from Duncan's Island to the mouth of Swatara; showing each kind of work done, amount thereof, and payments made to Contractors, on estimates of the Engineer, from the 21st day of June to the 30th day of November, A. D. 1828 by William Wilson, Superintendent of said division.

No. of Sections.		Names of Contractors.	Cubic Yards. Earth.	Hard pan.	Rock.	Slate.	Embank.	Puddling.	Perches of wall.	Grubbing	Miscellaneous.	Cost of work estimated as done.	Retained until completed.	Payments made.	Total cost of each section.	Total sum retained on each section.	Total payments made on each section.	No of sections.
No. 1	Canal	O. H. Dibble	46800						18800			28140	2700 75	25439 25				
	New channel	Ablot Green										1250	62 50	1187 50				
	Dam	Green and Cameron							6531		20100 perches rubble stone	16330 75	2343 62	14287 13				
	Guard lock	M. Byrne, Provest & co.							1460	laid in	sand, lime &c. furnished	10655	683	9722	56275 75	3659 87	50635 88	No. 1
2	Canal	Green & Cameron					34600		18603			30021	5374 20	24646 80	30021	5374 20	24646 80	2
3	Canal	O. H. Dibble		8100	2000		11600		2960			6302	799 90	5502 10				
	Road	do		4000					1800			3900	780	3120	10302	1579 90	8622 10	3
4	Canal	Jonathan Leslie	10725	600								1424 62½	284 92½	1139 70				
	Side culvert	John Durno							116	laid in		203		203				
	Waste Wier	George Schnabel & co							9		Wood work and paving	290		290	1917 62½	284 92½	1632 70	4
5	Lock No. 1	Isaac M'Cord	107		811				300	laid in	For materials E. $1214 50	5138 17	302 50	2835 67				
	do house	John Dector									For do estimated	200	40	160	3338 17	342 50	2995 67	5
6	Bridge No. 3	John Wilson									Embankment estimated at	25		25	25		25	6
7	Canal	Maurice Welsh	7418	6215	200		1880					2133 35		2133 35				
	Culvert	O. H. Dibble	674		100			500	539		Part slope wall 132 perches	1031 85		1031 85				
	Fence	John Wilson									77 pannel	30 05		30 5	3215 23		3215 23	7
9	Aqueduct Clark's	O. H. Dibble									Materials furnished	2335	127 75	2427 25				
	do do	M. Byrne, Provest & co							750		do do	5971 25	378	2093 25	5626 25	505 75	5120 50	9
10 & 11	Post fence	Peter Miller									793 pannel	513 02		513 2	513 2		513 2	10, 11
13	Canal	Christian Gleim	800		55		1060			85		340 65		462 75				
	Waste wier	George Schabel & co							9		Wood work & paving	293 50		293 50				
	Lock No. 2	Hodge and Guy							900	laid in								
	Aqueduct stony	M. Byrne, Provest & co							1740	laid in	Materials estimated $2205	13193	2439	9756				
	Lock No. 2	Jacob Updegrove									Sheet piling	66		66	16714 15	3204	13632 25	13
14 & 15	Canal	A. L. Beaumont & co	15200		5200		8650	8900	5700		200 perches road at $10	15775 50	1479 90	14295 60				
	Waste wier	George Schnabel & co							9		Wood work and paving	293		293				
	Post fence	Joseph Corbett									55 pannel at 80 cts	44		44	16111 50	1479 90	14631 60	14, 15
16	Culvert pit	George Schott									52½ days work	554 76		554 76				
	do do	Archibald M'Allister									Building culvert in full	243 16		243 16				
	Post fence	Joseph Corbett									Fence in full.	169		169	966 92		966 92	16
17, 18, 19, 26, 27	Repairs	George Schott									Repairs on canal	342 81		342 81				
18, 23, 23	*Post fence*	*John B. Cox*									Balance in full	74 85		74 85				
23	do	Jacob Richard									do do	26 25		26 25	443 91		443 91	17, 27
18	Lock No. 3	W. B. Johnson									Cutting stone	12 13		12 13				
	do	George Schott									Puddling &c.	224 75		224 75				
	do	Jacob Updegrove									Sheet piling	65		65				
	do	Robert Hedger							63		Slope wall	31 50		31 50	383 88		333 38	18
20	Canal	William Groves	3750		1350		2570				Bailing water E.	1972	114	1972	1972		1972	20
25	Waste wier	George Schnabel & co							9		Wood work and paving	291 50		291 50	291 50		291 90	25
28	do at lock	William Groves							164			287		287				
	do	Wallace, Holman, Johnson & Clarey									Repairs Lock No. 4	1123 07		1123 7	1410 7		1410 7	28
29	Lock No. 5	Jonathan Leslie									Balance due	600 75		600 75				
	Waste wier do	William Groves							151			264 25		264 25				
	Paving	Thomas Wallace							115		Slope wall and paving	196 12½		196 12½				
	Bridge No. 21	John Watkins	59				175		186		Pretection wall	279 15		279 15				
	Lock No. 5	Samuel Holman									Sheet piling	65 94		65 94				
	do	W. B. Johnson									Cutting Stone	12 13		12 13	1418 34½		1418 34½	29
30	Bridge & culvert	J. List & co									Retained per centage	9	9	9	9		9	30
31	Aqueduct	William Groves							90		Repairs	90		90				
	do	J. Spink & co. per Carson & M'Knight									Retained per centage	822 54	822 54	822 54	412 55		412 54	31
32	Lock No. 6	William Groves							116		Waste wier at Lock	203		203				
	do	Thomas Wallace							107		Slope wall do	160 50		160 50	363 50		363 50	32
35	Post fence	Michael Holman									158 Pannel	127 17		127 17	127 17		127 17	33
33	Culvert	William Groves									repairs estimated	70		70	70		70	35
37	Waste wiers	George Schnabel & co.							9		Wood work & paving	329 50		329 50	329 50		329 50	37
39	Bridge No. 34	James S. Espy										55 65		55 65	55 65		55 65	39
40	do 35	Alexander Groves					571		14			17	5	17	17		17	40
41 to 47	do 36 to 45 inclu.	Samuel Hopkins									Balance in full	1193 95		1193 95	1193 95		1193 95	41, 67
44	Turnpike	Richard Hugan									$20 per rod lineal	105		105	105		105	44
47	Waste wier	George Schnabel & co.							11		Wood work and paving	443 50		443 50				
	Double locks	A. L. Beaumont & co.						dry wall	2186	laid in	$12210 for castings	13577 8	545 27	14909 71				
	Bridge	do do	1800		1803		8980	780	208	140 cop'g	Wood work $100	987 50		987 50	17008 8	545 27	16340 71	47
45 & 46	Canal	C. Midler & co					1730				Retained per centage	119 6	119 6	119 6	119 6		119 6	45, 46
	Cast irons	John S. Wiesthing									For Locks	300		300	300		300	
	Damages	John Geiger										150		150				
	de	John M'Allister										50		50	200		200	
	do	J. M. Foster & S. Douglass									Counsel in damage cases	170		170	170		170	
	Incidental	J. Butler, Peacock und Freaburn									Coal, printing and postage	9 99½		9 99½	9 99½		9 99½	
	Engineering ex.	Samuel H. Kneass									Survey to Columbia	136 37		136 37				
	de	Leapeld, Groves & others									do do	86 20		86 20	222 57		222 57	
	Clay	William Shannon									For Pudding	15 90		15 90				
	do	William Clancy									do	2 55		2 55				
	Contingent ex.	Soloman Sprigman									Blank checks	4 23		4 23				
															171551 55½	18956 81½	152575 22	

1 75 a day for each horse & cart inclusive of board for laborers, and tools and bill for plank for piling, on proven account,
$3,
$188 for work done by direction of the Engineer, previous to March 29th, 1828, and at the rate of $1 a day for each hand, 1 50 a day for each horse, cart and driver, $1 for plank used, 9 71½ for night work, and $1 for clearing spalls off Ritchey's lot,
$8 a rod,
$1 a superficial yard for paving water course at out-let,
$2 a perch for 2 culverts, under embankments,
15 cents per cubic yard for completing banks,

From Feb. 25th, to March 19th, 1828.
$2 50 a d. for each wagon, horse & driver,
1 75 do for each horse and cart,
1 50 do for each driller and hand working in the water, getting out stone,
$1 a day for each common laborer, including boarding of hands, use of tools, and other expenses, except powder and rope, for which $4 were allowed, for superintending $30,
From March 17th, to April 23d, 1828,
$1 a day for each laborer,
1 50 do horse, cart and driver,
20 for superintending,

$42 for oiling & painting the gates, & for sheet-piling,
$500 each, of frame with cellars complete,
$1 a day, boarding and tools, included,

$500 each, of frame with cellars complete,
$34,
1 a perch for repairing abutment-wall,
5 for replacing timbers,
1 75 a perch
75 a foot for the sand stone coping,
41 88
70 a foot lineal for the railing,
10 a superficial yard for painting do
9 a pound for the lead,
$5 for lead and other materials,
1 25 a day for his own services,
$1 12½ do for each laborer, and bill for pumps, sharpening drills and powder on proven account.

C. MOWRY. Acting Canal Commissioner.

LIST of contracts made on behalf of the State, from the 1st Monday in November, 1827, by Charles Mowry acting commissioner on the Eastern division of the Pennsylvania Canal, until the 20th June, 1828, inclusive.

No of section.	Kinds of work.	Names of Contractors.	Date of Contracts.	Grubbing.	Excavation per cubic yard.				Per cubic yard.		Miscellaneous.
					Earth.	Rock.	Slate.	Hard Pan.	Pudding.	Embankment.	
					Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	
33	bridges No 26 & 27	Michael Holman,	1827 Nov. 5							20	
34	do 28									25	
35	culvert	Philip Egao,	6		15						
29	sundry jobs	George Shott,	9								$ 21
20	canal	Robert Williams,	10	Est. Eng.	15	60	Est. Eng			Est. Eng	
19	culvert				15					25	
40	aqueduct	Eli Russell,	15								
5	lock	Isaac M'Cord,	19		15				17	17	$ 4 per perch for masonry, $ 600 for the gates including mitre-sills and iron work,
23	fences	Jacob Rinehard,	19								75 cents per pannel,
51	aqueduct	Joseph Black,	21								70 cts a lineal foot for the railing and bannisters, exclusive of the land,
40	bridge near aqueduct	Samuel Hopkins,								15	37½ cts per cubic yard for foundation excavation,
41	bridge over drain at aqueduct	do do									1 50 per perch for wall, $20 for the wood work,
41	bridge No 37	do do									$ 10.
47	do 43	do do	21								75 cts a perch for slope wall,
			21							18	
2	canal	Abbot, Green & W Cameron	24		13	50	57	25	53	53	Vertical wall $1 a perch,
10	bridge at Clark's creek	John May,	26							15	
29	bridge No 24	Jonathan Leslie,	28								75 cts per c. ft. of cut stone coping,
29	lock 5	do do	28								$185 25 for 247 days work pumping,
4 to 21	farm bridge No 1 to 4, 6 to 12 inclusive road bridge 5 & 7	Isaac M'Cord,	29								Painting, $10 for each farm bridge, 15 for each road bridge,
29	bridge No 21	David Strahan,	29								$ 1 50 per perch for wing-walls,
28,29,30 & 31	sundry jobs	George Shott	Dec. 5								305.
47	bridge No 44										
And junction with Union Canal	canal	Matthew J. Roark,	17		8					18	
17	dam at M'Allister's	James M'Intire,	31							15	
16	aqueduct	do do	1828, Jan. 1								40 cts. per cubic yard for excavation of water-way, and $120 grobbing,
16	do	Philip L. Hays,	1	$ 12					40	40	80 cts per c yd for excavating foundation,
20	culvert	Charles Carson,	3								$ 40 for wooden-bottom,
35	do	e do do	3		10	50					54 do
18	canal at lock No 8	L. Hodge,	11							12	
40	bridge 35	Michael Malone,	12							13	
13	aqueduct	P. Provost & M. Byrne,	21								$ 4 50 per perch of masonry,
31	aqueduct	Carson & M'Night,	21								81 for the fenders,
41	bridge No 56	Samuel Hopkins,	21								75 cts per foot sand stone coping,
11	canal	Peter Miller,	27		10					15	87½ cts per perch for slope wall,
26	bridge across Paxton										$1 per foot lineal of wood work.
24	foot b. across canal										75 cts do do
23 to 24	29 bridges No 13, 15 to 43 inclusive	Thomas English,	March 1								All at string-pieces, t. p. rollers, fenders, $8 each bridge, $75 each—changed from 'farm' to 'public' bridges, Oiling and painting gates, sheet-piling and puddling at breasts, $48 for each lock,
27 & 36	bridges No 19 & 31										
25, 32 & 47	locks No 2,6,7,8 & 9										
36	bridge No 51	Michael Holman,	1							25	
48	do 58	C. O'Donnell,	1							15	
37	canal	Michael Holman,	3								Excavating foundation, leveling and preparing bank for slope-wall, 20 cts per foot lineal,
32	canal	W. Grimshew,	6								Clearing stone off lot and repairing fences, 85
32	fences	do	6								70 cts per pannel,
31	aqueduct	J. W. Kane,	17								
27	jobs	Joseph Williams,									Painting the wood work, 10 cts per foot lineal,
At junction with Union Canal.	bridge No 44	Thomas Elliot,	24								$2,
17, 19 & 19,	sundry jobs	Robert Williams,	26								$00 for the wood work and railing,
31	aqueduct	Thamar Spink,	27								At the estimate of the Engineer,
											Excavation of creek channel 20 cts per cubic yard, and $40 for removing a stable, fences, &c.
28	lock No 4	Lewis Clancey,	28								$2 50 for taking off old wicket-irons and putting on new ones,
45	waste gate	Thomas Elliott,	28								$24,
18	canal	Jacob Emrick,	29								15 cts per superficial yard of tow-path wall,
16	aqueduct	Jacob Updegrove,	31								$85 for fenders and sheet-piling.
	lock No 3	do do	31								42 for planking and piling at breast,
17	sluice and culvert	do do	31								$1,
30	culvert										
31	aqueduct	Joseph Black,	31								18,
14 & 15	turnpike	A. L. Beaumont,	April 1								10, a rod,
47	double lock	M. J. Roark,	1								1 a day per hand for bailing and pumping water,
do	do	do do	1								do do do do
16	bridge No 6	Wilson Haines,	3								$12 for towing-path, wall & embankment,
28 & 32	2 toll-houses of stone	Samuel Holman,	22								$360 each, stone work beneath at 1 62½ per perch, other work below the lower floor at estimate of the Engineer,
31	aqueduct	do do	21								Repairs $111 21.
29	fences	John Ritchey,	23								$1 a pannel including all materials, and 16 cts a pannel for removing and re-seting the board fence along Murray's lot,
28	lock No 4	Lewis Clancey,	22								For 4 cranks and 4 gudgeons,
45	turnpike near bridge No 40	Richard Hogan,	30								$20 a rod, finding all materials,
47	canal and basin	M. J. Roark,	30								Repairs, $1 a day for each hand, 1 25 a night for each hand, 1 75 a day for each horse & cart inclusive of board for laborers, and tools and bill for plank for piling, on proven account,
41	ditch	J. Marshall,	30								$5,
28,29,30 & 31	sundry jobs	George Schott,	May 5								$188 for work done by direction of the Engineer, previous to March 29th, 1828, and at the rate of $1 a day for each hand, 1 50 a day for each horse, cart and driver, $1 for plank used, 9 71½ for night work, and $1 for clearing spalls off Ritchey's lot,
36 & 37	turnpike	Michael Holman,	6								$8 a rod,
52	aqueduct										$1 a superficial yard for paving water course at out-let,
56	bridge No 51										$2 a perch for 2 culverts, under embankments,
38	do 32										15 cents per cubic yard for completing banks,
57									25		
28 to 47	finishing portions of canal	Michael Holman,	6								From Feb. 25th, to March 19th, 1828.
											$2 50 a d. for each wagon, horse & driver,
											1 75 do for each horse and cart,
											1 50 do for each driller and hand working in the water, getting out stone,
											$1 a day for each common laborer, including boarding of hands, use of tools, and other expenses, except powder and rope, for which $4 were allowed, for superintending $30,
											From March 17th, to April 25d, 1828,
do	sundry jobs preparatory to letting in the water in the spring.	Michael Holman.	6								$1 a day for each laborer,
28	lock No 4	Michael Byrne, Alexander and Paul Provost,	8								1 50 do horse, cart and driver,
13 & 18	2 lock houses	Jacob & Isaac Updegrove,	April 28								20 for superintending,
17	digging a drain at Fishing creek,	James M'Intyre,	May 5								$42 for oiling & painting the gates, & for sheet-piling,
5 & 47	2 lock hoose	John Dexter,	5								$300 each, of frame with cellars complete,
29	treech and other jobs	George Shott,	6								$1 a day, boarding and tools, included,
40	bridge No 35	Alexander Groves,	June 5								$300 each, of frame with cellars complete,
4	side culvert	John Dorno,	6								$34,
47	bridge No 44	M. J. Roark,	May 12								1 a perch for repairing abutment-wall,
17	repairing culvert	Jacob Updegrove,	June 13								5 for replacing timbers,
16	aqueduct,	do do	12								1 75 a perch
											75 a foot for the sand stone coping,
47	bridge No 44	Thomas Elliott,	12								41 88
16	culvert	George Shott,	19								70 a foot lineal for the railing,
											10 a superficial yard for painting do
											9 a pound for the lead,
											$5 for lead and other materials,
											1 25 a day for his own services,
											$1 12½ do for each laborer, and bill for pumps, sharpening drills and powder on proven account.

Pennsylvania Canal Office, Harrisburg, Dec. 5, 1828.

C. MOWRY, Acting Canal Commissioner.

ay of November, 1828, (being the first
Pennsylvania Canal.

rd.							
	Embankm't	Miscellaneous.					

And on final estimate to receive back
nsylvania Canal.

yard		Per perch of 25 cubic feet.			Cubic yard.
Slate Rock	Solid roc	Vertical wall	Slope wall outside canal.	Providing stone.	Slope wall, inner side of canal.
24	43	45	48	10	16
2	54	50	40	40	12½
20	50	45	50	50	25
25	50	50	50	60	15
20	50	48	50	60	25
27	43	47	48	37½	13
35	62½	62½	75	E	33
35	62½	62½	75	E	33
40	50	79	35	50	25
30	40	E	E	E	12½
30	40	E	E	E	12½
25	55	60	55	E	28
25	50	37½	37½	E	30
E	45	50	50	50	E
45	50	55	48	E	23
25	62½	62½	62½	E	E
25	55	48	50	50	13
24	50	50	60	50	18

N[illegible], $2 49 per perch of 25 cubic feet; and for No. 2,
rc[illegible] 25 cubic feet.
te[illegible] per foot lineal; and for stone work per perch of
oll[illegible]

do	and for do	do	$2 16
er do	and for do	do	$2 35
do	and for do	do	$1 80
do	and for do	do	$1 80

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LIST OF CONTRACTS made on behalf of the State, from the 21st day of June to the 3d day of November, 1828, (being the first Monday) by WILLIAM WILSON, Superintendant on the Eastern Division of the Pennsylvania Canal.

No. of Section.	Kind of work.	Names of Contractors.	Date of Contracts.	Excavation per cubic yard. Earth	Rock	Slate.	Hard-pan.	Embankm't	Miscellaneous.
No. 20	Section No. 20	William Groves	21st June 1828	15	60	E.		15	And on final estimate to receive back per-centage ret'd of R. Williams
9	Aqueduct, Clark's creek	Byrne, Provest, and Co.	24 do						$5 50 per perch of 25 cubic feet, timber, &c. at estimate of engineer.
18 28 29 31	Waste weirs at locks	William Groves	27 do						$1 75 per do do And for paving, 30 cts per square yard.
31	Repairs at aqueduct	do do	do						$1 do do for slope wall, other repairs at estimate.
	Repairs on canal	Thomas Wallace	do						Days work, making repairs along the canal.
29	Bridge No. 21	John Watkins	2 July	10				10	$1 87½ per perch of 25 cubic ft. for protection wall at bridge No. 21.
1 2	New road, &c.	O. H. Dibble	do				30		$1 50 do road wall, and $10 per rod lineal for road.
7	Section No. 7	Maurice Welsh	3 do	10	50	25	17	12½	Former contract for this section abandoned.
Along canal.	Post and rail fence	Peter Miller	8 do						Per pannel for locust posts 75 cts., and for chestnut 64 cts.
	Repairs on canal	George Schott	26 do						Days work in making repairs along the canal.
2829	Sheet piling locks	Samuel Holman	30 do						$131 88, for sheet piling and planking at locks No. 4 and 5.
18 28 29	Cuttiog stones, locks	W. B. Johnson	2 August						Cutting stone at locks No. 3, 4 and 5, for sheet piling $12 13 each lock.
39	Bridge No. 39	James S. Espy	do					15	Filling in abutments of bridge No. 39. section 39.
6 7	Bridge 3 and P. fence	John Wilson	5 do					$ 25	For post fence, chestnut posts per paonel 64 cts., locust 75 cts.
28 29	Atteading locks	Lewis Clancy	9 do						$1 per day attending locks No. 4 and 5, at letting in water.
33	Post and rail fence	Michael Holman	9 do						For locust posts, at the rate of $425 per mile.
1	Guard lock	M. Byrne, Provest and Co.	19 do		1 00			Dam 20	$3 75 per perch—Gates complete at the estimate of the engineer.
45	Coping bridge No. 40	Samuel Hopkins	25 do						For coping for bridge No. 40, 75 cts. per cubic foot.
13 18	Sheet piling, lock's	Jacob Updegrove	26 do						For lock No. 2, section 18, $60; and for lock No 3, section 18, $65.
28	Clay for puddling	William Clancy	2 Sept'r						Clay for puddling at lock No. 4, section 28, at 3 cts. per load.
1 2 3	New chaonel	Abbott Green	10 do						$8,500, new channel from dam one mile down the river.
35	Repairs, culvert No. 10	William Groves	27 do						$70, for repairing culvert No. 10, section 35.
28 29 31	Paving waste wier	Thomas Wallace	29 do						Paving waste wiers, 12½ per cubic yd.; and for slope wall $1 50 per perch.
4 13 15 25 37 47	Waste wiers	Geo. Schnabel and Co.	2 Oct'r						$6 per foot lineal, slope wall and paving at estimate of engineer.
29	Clay for puddling	William Shannon	17 do						Clay for puddling lock No. 5, section 29, at 15 cts. per load.
18	Slope wall, lock 3	Robert Hedger	3 Nov'r						For slope wall, per perch of 25 cubic ft., 50 cents.
41	Damages	Daniel Books	21 August						$70, in full for damage done lots on section 41.
32	do	Wm. Grimshaw, by his att'y	14 Oct'r						$193, for damage done his land on section 32.

No. 7 A 2.

LIST OF CONTRACTS made on behalf of the State, for the letting on the first of November, 1828, from the Swatara to Columbia, by WILLIAM WILSON, Superintendant on the Eastern Division of the Pennsylvania Canal.

No. of Sections.	Kind of work.	Names of Contractors.	Date of Contracts	Excavation per cubic yard. Clearing.	Excavation	Hard-pan	Embankm't	Puddling	Stone at block	Solid rock	Per perch of 25 cubic feet. Vertical wall	Slope wall out side canal.	Pencil-ing Joints	Cubic yard. Slope wall, inner side of canal.
3	Excavation Section No. 3	Brought & Dunbar	1828 Nov. 10	E	9½	17	18	16	24	43	45	48	10	16
4	do do 4	Stewart & Riley	do 20	100	9	18	15	20	2	54	50	40	40	12½
5	do do 5	Henry W Snyder	do 26	E	10	20	18	50	20	50	45	50	50	25
6	do do 6	Holmes, Beaumont & Co.	do 27	E	12	25	20	31	25	50	50	50	50	15
7	do do 7	Bull & Cameron	do 8	E	11	18	21	33	25	50	48	50	60	25
8	do do 8	Rodgers, Fielden & Co.	do 19	E	9	15	13½	17	27	43	47	48	37½	13
9	do do 9	Moore, Green & Barber	do 12	150	12½	25	25	35	35	62½	60½	75	E	38
10	do do 10	do do do	do 12	150	13	25	25	50	38	62½	62½	75	E	33
11	do do 11	Joseph M'Kinley	do 7	E	11	20	15	75	40	50	79	35	50	25
12	do do 12	Allen & Schott	do 5	100	10	16½	14	18½	30	40	E	E	E	12½
13	do do 13	do do 5	do 5	30	10	18½	12	15	50	40	E	E	E	12½
14	do do 14	Rodgers, Fielden & Nogle	do 20	100	12½	25	25	35	25	55	60	55	E	28
15	do do 15	Curren & Daugherty	do 24	40	10	20	14	15	25	50	57½	57½	E	30
16	do do 16	John Ekel	do 5	E	12½	25	15	23	E	45	50	50	E	E
17	do do 17	Bangs, Philips, Roberts & Co.	do 4	100	10	20	13	E	45	50	55	48	E	33
18	do do 18	Evans, Moore, Green, Barber	do 15	150	12½	25	20	31	25	62½	62½	62½	E	E
33	do do 33	Beaumont & Leach	do 18	E	10	25	25	51	25	55	48	50	50	13
36	do do 36	O. H. Dibble	do 18	60	10	19	26	24	50	50	50	60	50	18
2,13	Culverts No. 1 & 2	Marks & Brought	do 10	For culvert No. 1, sec. No. 2, $2 49 per perch of 25 cubic feet; and for No. 2, sec. 13, $2 74 per perch of 25 cubic feet.										
9	Aqueduct Conewago No. 1	Petrikio, Patterson & Co.	do 4	For wood work complete $11 per foot lineal; and for stone work per perch of 25 cubic feet, two dollars.										
10	do Conoy creek 2	Geo. Schnable & Co.	do 8	For do do $12 per do and for do do $2 76										
35	do Chiques cr. 3	M. Byrne, Provest & Co.	do 11	For do do $12 50 per do and for do do $2 55										
12	Bridge 1	Rodgers, Fielden & Co.	do 19	For do do $125 per do and for do do $1 80										
36	do 2	Geo. Schnable & Co.	do 7	For do do $115 per do and for do do $1 80										

na Division

lvania Canal, from its commence-

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			2429 61	
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			1256 41	
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			1680 19	$25 of the grubbing on the out-side of the line.
			3294	
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		706.60	5348 01	
			317 28	
			806 10	$20 of the grubbing by removing line.
			725 70	
			104	
			1477 97	
			3323 95	
			1541 98	
			4562 38	
			4566 26	
		855	2120	
		1254	4131 45	
		387	324	Percentage paid to successor,
			530 18	As per contract, having undertaken the work at the same prices as Coner.
			182 58	
			2169 74	
			5636 17	
		4900	9479 45	
		80	503 10	
		528	4250 80	
		1233	4656 52	
		3225	9329 81	Percentage reported Dec. 15th, 1827, $6775 60
			336,999 93	Unpaid amounts, 1255 31
6	15659.71	5485	141,836 32	
			478,836 25	8030 91
		684		
6	15659.71	4751	91 36109 54	
			60 449726 71	

STATEMENT of work done, percentage retained as security for completion, and payments made to contractors on estimates of the Engineer, on the Susquehanna Division of the Pennsylvania Canal, from its commencement in the autumn of 1826, until the 3d of December, 1828. Showing also, the aggregate amounts of work done, percentage retained and payments made since last report, dated the 15th December, 1827.

No of Section	Names of Contractors.	Grubbing and clearing.	Cubic yards: Earth excavation.	Cubic yards: Embankment.	Cubic yards: Puddling.	Cubic yards: Solid rock	Slate rock	Hard pan.	Perches: Vertical wall.	Perches: Outer slope wall.	Square yd. inner slope wall.	Miscellaneous.	Cost of work executed as done.	Percentage Payments retained.	Payments made.	Remarks
Section No. 1	Linton & Russel,	400	24503	13519		149	740	1020				Removing and putting up fence, S 12	$ 4354 98	$ 469 18	$ 3885 80	
Basin & lock pit near do	Michael Holman,		8658	5260				870					2329 50	279 20	2 14	
Turnpike compl. near do	John M'Laughlin,											232 rods of turnpike, S 1102				
												Culvert, 7—1100	1148 60		1148 60	
2	Michael Holman,	100	13620	52 83		423		2302		1627			8695 72	955 52	7 60 20	
Completed	3 M'Harque and White.	s & r 50	9256.68	7038.32	115	452. 3		804.80			93	Gravel over culvert, 27 50				
												Baling do				
												Making road, 24 —38 50	2089 75	301 21	1593 54	
do	4 Coulon and Co.	s & r 60	11586 96	10901.40	657.99	1105.83	160.66				860.66		5038 79		5038 79	
do	5 Eli Russell,	200	10950	4306		243.80			1149.10		77	Bailing culvert pit, 20	1844 79		1844 79	
do	6 John Ryon,	25	11809.07	5133.08		97.28			293				1370 56		1370 56	
do	7 Barnett and Daugherty,	75	10361 40	9454.13	1167.84	321.51			1167.84			do 5 60	2716 56		2716 56	
do	8 Noland and Co.	20	12256.75	2559 51		69.22			223 09			Protection wall, 137 56				
												Bailing temporary bridge, 4 131 46	1695 12		1695 12	
do	9 Michael Noland,	25	12058.58	5000.30	468	4			463.80			Gravel over culvert, 31 50				
												Bailing do 5 35 50	1885 08	439 16	1345 92	
Abandoned	10 Dodd & Co. original contractors,	50	12396	274		101							1379 40	f 193 98	1185 44	
do	10 Sheaffer & Bowes, successors		2984			16			1890				857 50	170 89	686 61	
do	11 Dodd & Co. original contractors,	s & r 135	12032	54203	8016	4095					5351		10612 72	f 982 56	8 40	
do	11 Sheaffer & Bowes, successors		2204	4752	5198	934		860			1697		4640 43	892 93	3812 50	
	12 John Ekel,	s & r 400	21377	51060	7602	7472	2700				4930	Chute for embankment stuff, 147 80	17720 51	1738 85	15981 66	
	13 John Seale,	s & r 250	17312	43695	9460	5034			5100		4318		16165 82	1738 78	16 23 04	
	14 Samuel Hopkins,	s & r 250	14145	24818		7002			4565	4726	890	Channel completed, 200	14378 93	1710 15	12825 80	
	15 Gleim, W. & S. Hunter, orig con	250	12076			360			150		955		3188 19	1437 62	1750 49	
	15 Peter Miller, successor	s & r 170	12048	5352		1139			3250		2286		6736 05	784 93	5951 10	
	16 J. and H. Mirick,	s & r 280	14524	4071		801			306		601		3255 61	458 73	2796 84	
	17 Curran and Byrne,	150	8492	2715		1786			1470				2819 27	314 50	3304 97	
	W. Montgomery and											Removing and putting up fence, 6 48				
Feeder on	17 James K. Moorhead,	100	7495	13555					410		596		3383 08	295 13	5037 95	
	18 Woodward and Sanford,	s & r 167	14758	8494	1303	2320			1452		1325 198					
												Shaping road, 60				
Completed	19 Ritner and Co.	s & r 250	15045 86	21852.12	8746.90	2060.28					5227.20 2758.79	Making temporary road, 4—64	4835 51	655 96	4179 55	
Mound on	19 Gallagher and Co.										240	Shaping road, 160	12616 56		12616 56	
	20 Provost and Co.	50	8242	8396	206	2740				2299	762	Clearing chan. & 11900 p. filling in 30	5322 92	356 86	4966 06	
Completed	21 W. Sullivan,	188 50	10687.41	2610.66		1067.57					2392.43		5263 19	555 11	4705 08	
do	22 Provost and Co.		10223.57	1008.19		840.57			3356.91		2277		4134 72		4134 72	
do	23 Henry Walters,	65	14514.63	1339.38	112	163			2193.44		469		2973 57	743 80	2229 77	$15 of the grub. out side of the line
												Bailing water out of section, 150				
												Building wooden culvert, 53				
												Bailing culvert pit, 4 25				
												Removing & put. up fence, 20 —79 25	2170 72	123 17	2170 72	
24	do do	25	10112	1112									1203	293 71	1079 83	
25	L. S. Woodward,	75	14158	8392							528		2801 78	266 55	2308 07	$25 do
26	Henry Walters,	10	11584	2752	240	1040				24	2226		8582 47		2316 94	
do	27 Allen and Co.	50	11173.56	4938.71	55.55	253.63		896.60	66.03		724.93		1872		1872	
Abandoned	28 Salmon and Allen, orig. con.	75	4710	1080				1049					700 08	f 140	560 08	
	28 Henry Walters, successor	50	2250	2476		368		2497			232	Bailing bridge foundation, 1 75	1731 89	344 85	1387 04	
do	29 Joseph Foster, orig. contractor	150	7458	470		170		90					843 66	f 113 50	730 16	
	29 Daniel Whitney, successor		2095	1518		153		1593			462		1188 75	177 55	1011 20	
	30 John Salmon,	301	8537	1251		370		455				Bailing bridge foundation. 9 60	1560 39	207 69	1052 77	
do	31 H. Larabee, orig. con.	20	3385			280		50					415 93	f 55 37	360 38	
	31 Jacob Hilliker, successor		4871	3654		1342		1849	94				2174 66	276 62	1898 04	
	32 Wilcox and Co.	s & r 200	17155	2361	419	1241		836				Temporary road, 20				
												2 coffer dams, 60				
												Bailing culvert pit. 40				
Abandoned	33 Nesbit & Co. orig. con.	s & r 91	1930	2390								Gravel over culvert, 48 64—168 64	3165 13	406 25	2757 90	
	33 B. Hale, successor	50	11486	22326	11516	520		550		4228			1 548 03	109 61	438 44	
do	34 J. M. and R. Allen, orig. con.	30										Baling culvert pit, 12	3019 76	1399 29	11620 47	
	34 John Miller, successor	60	12160	1032		241		692					51	f 10	40	
do	35 S. Camreon & Co. orig. con.	80											1066 54	286 41	1379 93	
	35 Isaac Brunner, successor	105	10095	3964	432	597		2084					80	f 16	64	
do	36 Ritner & Co. orig. con.	200	1400									Removing and putting up fence. 9 9.	2737 60	397 37	2340 93	
	36 J. Patterson, successor	165	8161	2222	1758	57							295	f 67	228	
do	37 Kenna & Co. orig con	150	10147	1907	1586	239		2015					1088 94	293 40	1795 54	$15 of the grubbing by altering line
	37 Henry Grove, successor					350							1640 38	f 156 50	1732 88	
	38 Stoughton and Wilcox,	240	9092	7668	956	202		684					247 50	49 50	198	
												Putting up fence 10 60				
												Clearing & preparing aqueduct foundation, 10 50—21 10	2567 70	471 61	2396 09	
	39 John Ryon,	325	12212	8012	821	1425		2904						727 71	3860 45	
Completed	40 John Walls,	25	12098	5339 40	14	812.91	198.94	1842.02			97.44	Culvert under bridge embankment, 12 28	4588 16			
												Gravel over culvert 21 60		908 16	1905 68	
Abandoned	41 John P. Schuyler, orig con	75	13460	1119		4017	50	120		1138		Baling culvert pit, 8 —29 60	2808 84	f 458 36	4025 85	
	41 Charles Craft, successor		1531	243		1452	180	385		306			4484 21	423 51	1990 28	
Completed	42 John P. Schuyler,	150	18356.65	2117.40		1537	161.72				83.77		2113 79			
												Road culvert, 53 12		543 49	2577 76	
	43 John Walls,	s & r 125	14566	11575	2001	1361		32	2619			Making road, 280 —535 12	5121 25			
												Removing & put. up fence, 2 70				
												Shaping road, 75		800 05	6332 53	
	44 John Cake,	75	9090	7496	1697	325	40	795		2158		Road culvert, 32 74—110 44	7132 58	693 85	4434 55	
	45 do	50	9928	4862		135		484				Making road, 50	5038 40			
												Bailing culvert pit, 22 50		167 26	1384 60	
Abandoned	46 Maclay & Lotz, orig con	20	633			50						Gravel over culvert, 28 98—51 48	1552 06	f 16 25	66 92	
	46 John and G. Herold, successors		8996	5313		120		1009					81 27	296 96	1634 38	
do	47 Andrew B Mitchell, orig con	15	4761			24							1841 34	f 76 62	306 50	
Completed	47 Daniel Sponenberg, successor	50	11134.12	5316.44	1771	147			121.78				383 12		2566 24	$10 of the grubbing beyond contemplated width.
	48 Groves and Fox,	s & r 145	17080	7147		909	10	820				Wooden culvert, 5	2566 24			
												Removing fence, 5 90				
												Temporary road, 45				
												Baling culvert pit, 51 50		452 49	3177 89	
do	49 John Forster,	10	8982.10	5629.11	78.22		189					Shaping road, 50 —152 20	3610 88			
												Making road, 578				
												Wooden culvert, 129				
												32.91 perches masonry, 49 36				
	50 John L. Ayres,	150	7535	12636		2280				607	694	Road culvert, 5 —552 36	2015 03		2015 03	
												Making road, 240		727 5		
Abandoned	51 James Appleton, orig con	150	1201	309								Removing fence, 4 20—244 20	5695 15	42 45	4967 60	
do	51 Henry Walters, successor		10567	1421		4976				3650			599 09	1112 59	556 64	
Abandoned	52 James Appleton, orig con	100	4874	844		594						Road culvert, 58 43	7054 09	111 84	3741 50	
	52 Henry Walters, successor		8875	4540		1880				2876	974		833 10	633 88	721 44	
	53 Mathias J. App,	33	8900	7809		1911					1196		5908	718 36	5274 18	
Completed	54 do	200	13279.95	4866		1685.32					88 3635	Making road, 380	5041 42		4323 06	
												do 410				
												Temporary road, 80				
Abandoned	55 George Spencer, orig con	s & r 205	10237	8496	6175	2207						Making waste wier, 25 10				
	55 John S. Ehle, successor		3260	1276		250					1036	Gravel for culvert, 50 —515 10	4902 65	f 523 50	4902 68	
	56 George Spencer,	s & r 270	17382.10	15565.40	8203	2480					787		4491 97	288 91	9968 47	
													1451 91		1165 00	
	57 Lessig and Myers,	75	10752.54	11095.48								Making road, 155		436 05		
Abandoned	58 Canoiogham & Co. orig con	190	2446									do temporary road, 80—210	6132 82		5096 75	
Completed	58 Henry Charles, successor	20	8968.58	1515.66									2044 74	f 58 84	2044 74	
do	59 Morrow and Brady,	175	6962	16681.29									283 45		244 00	
do	60 do		12951 84	3139.98				300					1248 39	649 30	1348 36	
do	61 James Smith,	20	13231.45	1629								Gravel over culvert, 46	3078 91		2429 61	
Abandoned	62 B. W. Snyder, orig con	30											1957 18		1957 18	
	62 James Smith, successor		12836	5645								Making culvert, 15	1256 41	f 10	1256 41	
Completed	63 Martin Weaver,	125	19360	15729.34	983								50	180 67	40	
Completed dam on	63 M'Curd, Schuyler & P. Martz,		189	118									1860 86		1 80 19	$25 of the grubbing on the out side of the line.
Completed	64 Morrow and Brady,	50	4544	14956.50					81.07			Work at the dam, 100 50	3494		5294	
												Work and materials,	3194 68		3194 68	
Side cut on 64 completed	Patrick Brady,	120	5513								706.60	Gravel on banks, 94 44	5345 01			
Abandoned	65 Wynn and Bell, orig con	25	9594	1716								Baibling 3 coffer dams. 146 00—240 74	101 36	284 28	3345 01	
	65 W. J. Myers, successor		5920	1540								Bailing water. 60	902 50	f 96 40	347 28	
do	66 J. M. Allen, orig con	150											907 50	181 80	806 10	$20 of the grubbing by removing line.
	66 Philemon Dodd, successor		10572	2906				425					150	f 26	725 70	
	67 Simon Cameron,	25	22280	6000				1830					1846 08	368 11	104	
do	68 W. Sternbergh, orig con	50	16175										5889 40	963 45	1477 97	
	68 J. H. Poole, successor		9235										1688 50	f 146 50	5323 95	
	69 H. W. Snyder, orig con	200	29131			210		5660				Making fence 11	5531 60	969 27	1541 98	
	69 Simon Cameron, successor		6816			515					853		5144 71	f 578 45	4562 30	
do	70 Dearmood & Co. orig con	175	28913			165					1254		2648 31	528 5	4516 26	
	John C. Lessig, successor		1060			295		5456			387		4779 57	f 647 84	2120	
Part of 71 abandoned	Abr. Coner, orig con		3898					827					605 50	81 50	4131 45	
													662 66		8 4	Percentage paid to successor.
Completed	do Daniel Hogan, successor	80	10497												550 13	As per contract, having undertaken the work at the same prices as Coner.
Residue of	71 John C. Lessig,		39274			50		1675					2169 74		132 53	
	72 Peter M'Ginley,	100	18936				880	2101			4900		6671 24	1065 07	2169 74	
Abandoned	73 M'Curd and Schuyler, orig con			14263		150					50		11847 40	2367 98	3636 17	
	73 Peter Martz, successor			2899							208		571 87	f 68 77	9479 45	
	74 Isaac M'Curd,			16344							1255		5509	1058 20	503 10	
	75 do		3420	21255							3225		5223 94	567 43	4250 80	
				22880		60							10578 60	1247 79	4656 52	
	Grubbing and clearing 4482 75		9434.50	1018290.1	864439.73	81626.50	80092.67	5200.32	74825.90	15659.71	54857.80	18542.98			9329 81	Percentage reported Dec 15th, 1827, $6725 60
	On road and removing line, 517 62		1799.75	233881	70449	929	6082	768	2256		6845		7641 08		1825 21	Unpaid amounts, 1825 21
	Aggregate amounts of work done, &c. since Dec. 15, 1827,		4634.75	794409.1	394090 73	81305.50	73580.87	4432.82	72589.90	15659.71	47514.80	18542.98	(sheet 6) Locks, aqueducts, &c.	157,129 81	15298 49	141,856 32	8050 91
	Deduct amounts reported Dec. 15 1827.												From the commencement,	794 90			
														536,989 76	58158 51	478,830 25	
													Stated under head of g.	5117 00—477 90	44140 45	88030 91	36109 54
													Locks, aqueducts, culverts, &c. as above, $ 157,129 81	6056 48	493849 31	30192 60	18786 71

Pennsylvania Canal Office, Liverpool December 5, 1828.

C. MOWRY, Acting Canal Commissioner.

N. B. S & R prefixed to grubbing, means that it was done on the section and road. F. prefixed to sums of percentages, means that they are forfeited to the State.

	Cost.		Percentage.		Payments.	
	Dolls.	Cts.	Dolls.	Cts.	Dolls.	Cts.
WAST	150		30		120	
FENC						
58						
R						
	11,306	88	1179	12	10,127	78
	15,012	13	989	90	14,022	23
	1,491	30			1491	30
	157,129	81	15,293	49	141,836	33

	Names of Contractors.	Cost		Percentage.		Payments.		Cost.		Percentage.		Payments.	
		Dolls.	Cts.	Dolls.	Cts.	Dolls.	Cts	Dolls.	Cts.	Dolls.	Cts.	Dolls.	Cts.
WASTE WEIRS on sects. 44 to 52	L. B. Stoughton							150		30		120	
FENCES on sections 3, part of 3 and 6	B. Kepner	210	45			210	45						
8	Joseph Steel	274	50			274	50						
18	Fr. Montgomery	117	45	77	45	40							
4 5 9 17 18	Wm. Montgomery	640	97			640	97						
21 22 23	P. Ritner	973	25			973	25						
27	Chn. Stailey	7				7							
26	John Roush	36	75	36	75								
31	Jos. Shuman	311	79	64	37	247	42						
41	John Rine	113				113							
47 48	Ab. Blazer	265				265							
53 to 55	Sam. Witmer	280		80		200							
57 58	Geo. Fisher	491	80			491	80						
58 59 60 61 62 completed.	Peter Richter	1239	45			1239	45						
67 68	Jacob Gingrich	9	87			91	87						
63 64	James K. Davis	263	52			263	52						
68	Dan. Hummel	373	37	49	50	323	87						
70 71	Geo. Gaugler	167	95			167	95						
CEMENT for the works.	John Wells, manufacturer thereof on the Susquehana, 2229 bbls. at $2 17	3609 75						5878	12	308	07	5570	05
	Store house	140 00											
		4040	75			4040	75						
	Purchased in Philadelphia.												
	31 bbls at $6, 70 cts, including drayage, paid R E. Griffith	207 70											
	51 bbls at $6, drayage 5 50, paid to S. H. Thomas	191 50											
	500 bbls at $4½, paid Ralston & Lyman	2250 00											
		2649	20			2649	20						
	Costs of transportation, tolls, &c.												
	Of 319 bbls from Philadelphia to Middletown, paid to Carlisle and Humphreys	278 16											
	287 bbls from Middletown to Duncan's Island, paid to Jac. Nalbach 152 23												
	Geo. Lauman 111 25												
	S. Denning 5 50												
		169 00											
		447	16			447	16	7137	11			7137	11
								21,806	70	1722	60	20,084	10
DAM Shamokin ripples	Drake & Co												
LOCKS, outset. No. 1 2 3 4 5 7 8 9 10	Provost & Co	38,326	56	4901	58	33424	98						
Guard lock and gates at feeder on sec. 17	Paul Provost	455	30	90	66	362	64						
6	Patrick Donnelly	6035	03	813	83	5221	20						
11 12	L. Hodge	9811	46	1313	15	8498	31						
LOCK HOUSES on sec. 10 17 20	Alter & Fortney	250		250									
25 29 34 38 46 71	David Nesbit	2012				2012							
BRIDGES, on secs. 1 2 3 to 27	B. Hale	2209	75	296	80	1932	95						
	Hale & M'Cord	4016	75	681	11	3335	64						
35	L. B. Stoughton	808	92			808	92						
54	G. Salmon	94	50			94	50						
39 to 56 (stone work)	I. M'Cord	2843	15			2843	15						
28 to 56 (wood do)	R. Winslow	1399		45	75	1353	25						
57 to 71 (stone & wood)	G. Schnabel	2021	60	259	17	1762	43						
57 to 71 (cofferdam)	Schnabel & Co	140		30		110							
72	L. B. Stoughton	217		42		175							
Over the Susquehanna at Duncan's Island	Ryon & Baldwin	23988	55	2339	75	21648	80						
CULVERTS, on sects. 3 to 9 completed	Ervant & M'Davitt	2487	28	551	65	1935	63						
4 do	B Hale	126				126							
5 6 7	John Hines	782	40	157	40	625							
9 do	Peter Ritner	418	50	168	50	250							
13 do	John Seale	444	37			444	37						
25 to 59	Wells, Myers & Springer, original contractors After sub-division	127	87	25	57	102	30						
25 to 32	C Springer	95	50	19	10	76	40						
33 to 59	F Myers	399		65	12	333	88						
Relet 26 to 31 comp.	H Walters	2277	32			2277	32						
do 32 to 36	L B Stoughton	964	09	191	78	772	31						
do 40 do	John Wells	560	05			560	05						
do 45 do	H Lotz	447	90			447	90						
do 48 do	H Charles j	994	81			994	81						
do 53 54 do	M J App	1069	29			1069	29						
58 of wood do	J M'Mutrie	114	50			114	50						
AQUEDUCTS, on sects. 17	P Provost	1425		285		1140		11,306	88	1179	12	10,127	76
20	do	1774		292	20	1481	80						
38	Stoughton & Wilcox	2754		412	70	2341	30						
Completed 56	J Spencer	9109	13			9109	13						
LIME for works.	Brosius and Bingham							15,012	13	989	90	14,022	23
								1,491	30			1491	80
				For work and materials on the above.				157,129	81	15,293	49	141,836	32

(No. 1,

ber, A.
whom s

contracts,
viz.

Yard.	Rod.
ner ope all.	Shaping road.
ts. 23	Dols

s and locks No. 1 and 2

4, 5, 7, 8, 9 and 10,
nd gates at he feeder on

ars each and 75 cents a cubic foot for coping,

ars do do

wings included, do

and other requisite work to be estimated by the e

s.

Of white-oak posts per rod:

			80 cents
			do
			do
	Feb	21	
1827	Dec	14	
1828	May	19	do
	July	24	do
	Mar	15	do
	Feb	21	do
			do
	May	31	do
	Oct	15	
1827	Dec	15	do
1828	July	15	do
	Sept	15	87 cents
			80 cents
		15	do
1827	Dec	15	
1828	Feb	20	do
		13	
	Dec	14	87 cents
	Sept	15	80 cents
	May	19	do
			do

			15
1828	May	20	
	July	14	
		19	
		15	
		15	
		15	
	Feb	23	
	Aug	15	
	Oct	15	
1828	July	15	

List of Contracts made on behalf of the state, during the year preceding the first Monday in November, A. D. 1828, by Charles Mowry, acting commissioner on the Susquehanna Division of the Pennsylvania Canal, together with the names of the persons with whom such contracts have been made, viz—For excavation.

No. of Section.	Date of contract.	Names of Contractors.	Grubbing & clearing	Excavation	Per cubic yards: Embankments	Puddling	Rock	Slate	Hard pan.	Vertical slope wall.	Outer slope wall.	Inner slope wall.	Yard	Road	Miscellaneous.
			Dollars	Cents.	Cents	Cents	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Dols	
1	1828 Feb 20	W. Linton and P. Russell	400	7½	12	18	45	18	14	50	28	23			
Near 1	Sep 22	John M'Laughlin			11										
2	Feb 23	Michael Holman	100	10	14	25	50	25	20		100				
Unfin. part of 15	Jan 1	Peter Miller	87½	12½	15		50	50	25	87½	87½		15		Road at estimate of engineer.
17	April 26	Patrick Curran & Jas Byrne	Est eng	12	13		50	Est. eng	25					125	Same prices for road as for canal.
19	June 13	Peter Ritner											30		
24	1827 Nov 23	Henry Walters	25	10	15	8	50	50	18						Reduced to this price from that in former contracts, by mutual consent.
26	1828 April 16	Henry Walters											25		
Unfin. part of 28	July 14	Henry Walters	50	14	17	62½		37½	27	150	100	20			
do of 29	May 17	Daniel Whitney		12	15	20	50	50	30						Back per centage on Joseph Forster's work in addition.
30	1827 Nov 17	John Salmon	350	10	14	16	40	25	17	45	55	17			
Unfin. part of 31	1828 Feb 21	Jacob Hilliker	Est eng	9	13	25	50	25	25		45	18			
32	1827 Nov 17	R. Wilcox, G. Schnable and L. B. Stoughton	100	10	12½	19	50	25	18	45	45	13	100		Grubbing road at estimate of engineer—road excavation, embankment and wall, same as for canal. Canal and road do do.
Unfin. part of 33	21	B. Hale	50	11	16	27	50	37½	18	100	100	13	100		
do of 34	1828 Feb 21	John Miller	60	10	14	13	50	37½	18						
do of 35	1827 Dec 15	Isaac Bruner	150	11	15	25	50	31	25	Est.	Est.	Est.			
do of 36	1828 Feb 21	John Patterson	150	13	11	25	55	31	25	30	63½	17			
do of 37	Sept 8	Henry Groce, junior		15	18½	18½	75	33	20	100	100	18			Dressing and shaping canal banks, on the whole section, $150.
38	1827 Nov 16	L. B Stoughton & R. Wilcox	240	11	15	23	50	25	17	50	13	25			
39	16	John Byon	325	12½	14	20	60	25	25	70	70	15			
Unfin. part of 41	1828 Aug 13	Charles Craft		16	16	23	100	37½	25	70	70	20			
44	1827 Nov 17	John Cake	Est eng	12	14	18	65	23	25	100	100	13	100		Grubbing road at estimate engineer—road excavation, embankment and wall, same as for canal.
Unfin. part of 47	24	Daniel Stonenberg	20	10	15	20	50	37	25	50	50	15			
48	13	Anty Groves & James Fox	100	14	14	20	50	25	18	50	50	15	100		do do do
50	17	John L. Ayres	150	12½	12½	14	60½	25	18	75	75	15			$300 for making the road.
Unfin. part of 51	1828 Jan 19	Henry Walters		11	14	14	60	25	18	87½	87½	15			
do of 52		Henry Walters		12	14	14	60	25	18	87½	87½	15			
do of 53	Aug 15	John J Ehle		12½	16	30	100	25	25	70	75	20			
do of 58	Feb 20	Henry Charles	Est eng	11½	13										
60	1827 Nov 17	J Morrow and Patrick Brady	350	10	10	12½	35	20	12½	35	35	14			
Unfin. part of 62	1828 May 19	James Smith		9	12½										
do of 64	20	J Morrow & Patrick Brady	50	10	23										
Side-cut on do to connect Penn's creek with the canal.	July 13	*Patrick Brady*	100	12	14										
Unfin. part of 65	31	W J Myers		12½	12½		62½	37½	20						Residue, if any, at estimate of the engineer.
do of 66	May 20	Philemon Dodd		12½											
67	1827 Nov 17	S Cameron	25	12½	12½	15	50	25	18	50	50	13			
Unfin. part of 68	1828 March 16	John H Poole		16			50								
69	1827 Nov 17	H. W Snyder	250	14	15	15	55	25	14	87½	87½	15			
Unfin. part of do	1828 Sep 15	S Cameron	Est eng	16	13		55	30	18	120	120	15			If any, for lining 15 cents per cubic yard.
do of 71	March 1	Abe Coner		17											From section 70 to Dr. Hottenstine's run.
do re-let	April 22	Daniel Hogan		17											Coner's per centage in addition.
Unfinished upper part of 71	Jan 21	John C Lessig		15 for firs 9 ft in dep 19 for res			50	25	18						
72	Jan 19	Patrick M'Ginley	Est eng	15	25					100	100				Of coarse materials—of fine 15 cents.
73	Feb 21	Isaac M'Cord & Jos Schuyler	do	Est eng	18½						100				From rocky bluff to section 74—residue 25 cents.
Unfin. part of do	July 31	Peter Maritz			53						100				From below end of bluff at Mr. Ginley's quarry—residue 25 cents.
74	1827 Nov 30	Isaac M'Cord & Simon Cameron	do	do	18½		60	60	Est. eng.	100	100	15			
75	30	do do	do	do	18½		60	60	do	100	100	15			
Dam at Shaw-noken ripples near Sunbury.	16	John R Heske, Jno P Schuyler, Henry Walters, Isaac M'Cord & James Fletcher													For making entire dam, and finding all the materials, including levelling of foundation, and every thing between abutments—six dollars and fifty cents per foot lineal. For making abutment walls in range-work, finding all the materials, two dollars and fifty cents a perch of twenty-five cubic feet of masonry. For excavating foundation of abutments, twenty cents a cubic yard. And for filling in said abutments at the estimate of the engineer. And should any other work be directed not included in the above specification, the same shall be paid for at the estimate of the engineer.
Basin & pt of cut of 1st lock & foun. of wing walls of bridge near section 1, on Duncan's island.	1828 Aug 6	Michael Holman		18½	20		63½								Baling at estimate of engineer.
Culverts on sec. 5, 6 and 7	Sept 16	J Hines		Est eng	25	25	Est. eng.								
Dam and feeder section 17	Feb 20	W Montgomery and James K. Moorehead	Est eng	7	24½ dam 16 feed. 15 ul.	15	50	37½				87½			462 cts. a perch for mason-work—4 cts. a foot for timber, inc. carpenter work—other requisite work at estimate of engineer.
Mound opposite section 19	do 21	Thos Gallaher, Geo Fulker and David Decker													Timber and feet lineal, 5 cents.—Cap-piece of oak, do 15 cents. Plank 80, per 1000 feet board measure.—Gravelling and backing up at 25 cents a cubic yard.—Framing and puttlig in timber, incl. sluice for arks, &c. $3 per foot lineal. Other work at estimate engineer.
Unfin. part of dam on sec. 63	March 21	Peter Martz		15	50					25					Slope wall outside per perch—Of stone from within the canal 60 cents—Of stone procured from without the canal, $1. At 84 75 per rod, lineal. 6 ditto.
Unfin. part of sec. 70	Nov 1	John C. Lessig		18½			50			25					
Turnp. on sec. 1	May 27	John M'Laughlin													
do do	Oct 27	David W Huling													
Unfin. parts of secs. 10 and 11	July 15	Sheafer and Bower	40 & for sec 10	12½	*		75	18	25	50	*	30	31 50		*Embankment 20 cents, when procured from section 10 for section 11, otherwise 15 cents.
Slope wall on sec. 19	June 13	Peter Ritner													

Pennsylvania Canal Office, Liverpool, November 3d, 1828.

C. MOWRY, Actiug canal commissioner.

For locks, waste-weirs and luck-houses, viz.

	Date of contracts.	Names of contractors.	
Outlet locks and locks	No. 1 and 2	1823 Feb 11	Paul Provost, Robert Wright and Michael Byrne,	4400 dollars each and 75 cents a cubic foot for coping,
Locks No. 3, 4, 5, 7, 8, 9 and 10, Guard lock and gates at he feeder on section 17,		1827 Nov 19	do do	4440 dollars do do do
		1828 July 14	Paul Provost	1670 dollars
Lock No 6,		1827 Nov 23	Patrick Donelly,	4440 dollars do
Locks No 11 and 12,		do 20	L. Hodge,	8 dollars a perch for the rough stone work, 12 dollars do do out
Lattice valves for 58 lock gates,		1828 Oct 15	Seymour and Langford,	Excavation and embankment at the estimate of the engineer—cement to be found by the state 41 cents—price to be deducted from pay to lock contractors
2 wooden waste weirs on sec 1 & 26,		1828 July 14	Paul Provost,	$5 73 per running ft. } Inclusive of digging fond and embank-
5 do do on sec 42, 45, 47, 50 & 51,		do do	L. B. Stoughton,	4 50 do } ments—excavation to be estimated.
3 lock houses of frame,		July 15	William Aiter, John Fortney,	$450 each, viz: 2 on section No 1, 1 on section 10, 1 on section 17, and 1 on section 20
6 do		Aug 14	David Nesbit,	$460 for that on section 25, 450 for that on section 29, 440 for for that on section 34, 435 for that on section 38, 450 for that on section 48, and 449 for that on section 71. Painting included—excavation of cellars to be estimated by the engineer.

For cement for the locks, aqueducts and culverts where necessary, and for a cement store-house.

			Per barrel of 4 bushels each.
4000 barrels deliverable at the mouth of Mahantango creek, or higher up if required,	1827 Nov 17	John Walls	$1 75
Cement store house on the bank of Mahantango creek,	1827 April 16	John Walls	140

For Bridges.

On what sections.			Stone work, per perch of 25 c. ft.	Wood work.
At head of No 1, over the Susquehanna river,	1823 Feb 19	John Ryon, jr. and Ephraim Baldwin,	Rubble $2 50	$43600 on the lattice plan
On No 1 farm bridge,	" 21	B. Hallo	Cut at est. of the engineer,	
2 road do	" "	do	Range rubble in mortar 1 70	$90 inclusive of painting
			do 2 50	
			Scabbled sand stone in regular courses, 2 50, coping at estimate of eng.	$123 do do
3 to 27,	1827 Nov 15	B. Hale and Joseph M'Coul,	Range rubble work 1 75	$123 for each road bridge
				90 for each farm bridge
28 to 32,	" 23	W. H Wells,	do 1 75	
28 to 56,	" 24	Reuben Winslow,		$70 for each road bridge, 60 for each farm bridge, and 15 for the painting of each
33,	Dec 10	L. B Stoughton,	do 2 00	$80, including coping on the wings
34, farm bridge,	1828 Oct 16	C Salmon,	do 1 75	
39 to 56,	1827 Nov 10	Isaac M'Cord,	do 1 75	
41,	1828 May 20	John P. Schuyler,	Cut sand-stone, cap. at est. en.	
57 to 71, (farm)	1824 Nov 11	George Schnabel,	Range rubble 1 60	$35 each
do	1828 July 14	do		$0 for the painting of each
59 and 63 road,	Oct 13	George Schnabel, & Co.	do 1 75	$70 each, inclusive of painting

For Aqueducts and Culverts.

AQUEDUCTS.	Date of contracts.	Names of Contractors.	Per perch for masonry	Per ft lineal of wooden.	
Montgomery's creek,	1828 July 14	Paul Provost	$3 50	$9 00	
Ritner's do	do	do	3 50	9 00	
Mahantango do	1827 Nov 16	L B Stoughton & R Wilcox	1 87	13 50	
Middle do	Dec 15	John Spencer	4 00*		* If in cement, found by the state
			3 75†	8 50	† If dry. Ice breakers—$20 per 1000 feet board measure—8 cts a foot lineal for the flat timber in foundation—Excavation of foundation out of water, 15 cents per cubic foot.
do	1828 Oct 20	do			Pudding 20 cents per cubic yard—stone filling around piers 50 cents per do.—lime 25 cents per bushel—$1 per day for baling water, raising sides of superstructure higher than represented on the plan and specification—painting superstructure 45 dollars.
CULVERTS.					
On sec 3, 4, 5, 6, 8, 9,	1827 Nov 12	Samuel Bryant and James M'Davitt	3 50		
7	do	do	2 62		
9	Oct 4	Peter Ritner	3 00		
13	Dec 15	John Seale	2 75		Cement and lime to be found by the state.
17, 18, 19, 20, 21, 22, 23 and 24,	Nov 19	Paul Provost and Robert Wright	2 18		Wooden bottom and other work not specified, if ordered by the engineer, to be estimated by him.
25 to 59,	"	W. H. Wells			
	"	F. Myers and C. Springer	1 87		
26 to 51, re let,	1828 May 20	H. Walters	3 00		Coping on wings included, do
52, 55 and 55 do	July 14	L. B. Stoughten	2 87		
40,	15	John Walls	3 00		
45,	15	Henry Lotz	3 00		
46,	15	Henry Charles	2 75		
49 and 54 do	15	M. J. App	3 00		
67 and 69,	Feb 28	Paul Provost	2 12		
Road culvert on sec 4	Aug 15	B. Hale	2 00		
Wooden do on sec 58	Oct 15	John M'Mutrie		1 00	Sheet piling and other requisite work to be estimated by the eng.

For lime for the Culverts and other works.

In sufficient quantities	1828 July 15	Geo. Brosius & Adam Bingham,	10 cents per bushel.

For Fence.

			Of locust posts per rod.	Of white-oak posts per rod
4,	1828 April 21	W. Montgomery	$1	80 cents
7 and 8,	Feb 21	Joseph Steel	do	do
Through lands of D. Hiding & others,	June 14	Ben. Kepner	do	do
16,	Feb 21	Frazer Montgomery	do	do
18 and 19,	1827 Dec 14	W. Montgomery	do	do
20, 21, 22, 23, 24, 25,	1828 May 19	P. Ritner	do	do
27,	July 24	C. Stailey	do	do
30 and 31,	Mar 15	Joseph Shuman	do	do
33, 34, 35, 36, 37, and parts of 44, 43, 41 and 42,	Feb 21	Isaac Bruner	do	do
39 and 40,	May 31	Frederick Kremer	do	do
61,	Oct 15	John Rine	do	do
44, 45 and 46,	1827 Dec 15	George Harold	do	87 cents
47 and 48,	1828 July 15	Abraham Blaser	do	80 cents
Through lands of lately Thornton's,	Sept 15	L. Hodge	do	do
55 to 58,	" 15	Samuel Wittmer	do	do
56, 57 and 58,	1827 Dec 15	George Fisher	do	87 cents
59, 60 and 66,	1828 Feb 20	Peter Richter	do	80 cents
64 and 65,	" 13	" do	do	do
68 and 64,	June 14	James K. Davis	do	do
69 to 71,	Sept 13	Daniel Hummel	do	do
70 and 71,	May 19	George Gaugler	Of Chesnut posts 87 cts per rod.	87 cents

31.	To George Mish, in full for damages to his land on section 31		60 00
	To Peter Pancake, do. do. do. section 30,		55 00
	To John Shoch, do. do. do. do. 31,		60 00
April 28	To Alex. Chambers, do. do. and destruction of a house, on section 15,		1,000 00
June 2.	To Henry Lackey, for stoppage of his saw-mill, whilst feeding the canal from Fishing creek to Middletown in April last		64 50
4.	To Widow Earley, in full for damages, to her property in High Spire		125 00
6.	To J. Mahon, in full for do. in Swatara township		120 00
	To Espy & Co. in full for do. to a distillery at Hunter's falls		300 00
9.	To Peter Keller, in full for damages, to his property in Swatara township		25 00
10.	To Elizabeth Murray, for damages, to her out lot near Harrisburg		20 00
11.	Thomas Elder, for damages, to property near Harrisburg		90 00
19.	To J. Davies, Esq. for costs in the sundry damage suits		13 59
			2,639 30
	To Samuel Douglas and John M. Foster, Esq's. as counsel fees in damage cases, at different times		330 00
			2,969 30

The foregoing items have been paid.

The following are cases of damages assessed by viewers under process of law and were left by me in a state of ligitation.

1828.

June 2.	George Fisher, Esq. damages to farm, in Susquehanna township			1,500 00
5.	William Paffenberger, do. in Middle Paxton do.			350 00
	Adam Fertic, do. in do. do.			500 00
6.	James Patterson, do. in do. do.			600 00
14.	Heirs of Felix Landis, deceased, damages to three lots or pieces of land in Swatara township,			
	No. 1.	668 00		
	2.	86 00		
	3.	154 00		
		908 00		
				3,858 00
				6,827 30

C. MOWRY, *Acting Canal Commissioner.*

Pennsylvania Canal Office,
Harrisburg, Dec. 5, 1828.

No. 9.

C.

Statement of the amount of damages agreed to be paid to individuals, or assessed in favor of individuals, against the state, on the Eastern division of the Pennsylvania canal, from the 21st of June to 3d November, 1828, (being the first Monday) by William Wilson, superintendant of said division.

August 21st, 1828. Daniel Books, for damages done three lots of land in Highspire, Dauphin county, on section No. 41, $70.

October 14. William Grimshaw, by his attorney, George W. Harris, for damage done, and land taken by the canal, two acres and sixty-six perches, in Swatara township, on section No. 32. $193.

Assessed in favor of:

August 13. William Maclay's heirs, on section No. 28, $1,450.

October 28. Archibald M'Allister, in Susquehanna township, on section No. 16, 7,337.

No. 10.

Eastern Division, No. 3.

List of the names of all superintendents, engineers, assistant engineers and clerks, employed on the eastern division of the Pennsylvania canal, with the amount of wages or salary of each, from the first Monday in November, 1827, until June 20th, 1828.

Charles Mowry, acting commissioner $ 3 per day until June 20th 1828, inclusive, when he relinquished the charge of the eastern division; not paid per diem in that division, while engaged on the Susquehanna, nor during session of the board.

F. W. Rawle, engineer $ 1,460 per annum, until May 3d, 1828, when transferred to the west branch division.

Samuel H. Kneass, assistant engineer $ 60 per month until April 10th, 1828.

Samuel H. Kneass, principal assistant engineer $ 3½ per day until May 3d. 1828.

Samuel H. Kneass, engineer $ 1,400 per annum, from May 4th 1828.

George Merrick, assistant engineer, $ 60 per month until May 3d. 1828.

George Merrick, principal assistant engineer, $ 3 50 per day from May 4th, 1828.

F. W. Leopold, clerk of the works $ 2 per day until December 24th, 1827.

F. W. Leopold, clerk of the works $ 2 50 per day from December 25th, 1827, until June 20th, 1828; not paid on the eastern division, while engaged on the Susquehanna division.

William Groves, superintendent of masonry, $ 3 per day until June 5th, 1828.

C. MOWRY,
Acting canal commissioner.

Pennsylvania canal office,
Harrisburg, December 5th, 1828.

List of names of superintendants, engineers, assistant engineers, clerks and persons employed on the eastern division of the Pennsylvania canal, with the salary or compensation of each, from 21st of June to the 3d of November, 1828, (being the 1st Monday.)

William Wilson, superintendant, 18th June, 1828, $ 3 per day.
Samuel H. Kneass, engineer $ 1,460 a year.
George T. Merrick, assistant engineer, $ 3 50 per day.
Joseph J. Wallis, clerk, 18th June, $ 2 50 per day
George M. Lauman, target bearer 9th June $ 1 50 per day.

Mr. Wilson left home on the 18th June, 1828, to take charge of the line, but did not get charge of the papers, &c. until the 24th June.

Joseph J. Wallis, same as above.

No. 11.

Liverpool, canal office,
December 1st, 1827.

To the board of Canal Commissioners of Pennsylvania,

GENTLEMEN,

I have the honor to transmit the following estimate of the cost of completing the Susquehanna division of the Pennsylvania canal.

Total cost of excavation,	$ 20,201	54
Ditto embankment,	28,919	70
Ditto ditto to be procured from a distance,	17,031	68
Ditto puddling,	8,481	78
Ditto solid rock,	13,654	96
Ditto slate rock,	233	68
Ditto hardpan,	5,712	98
Ditto vertical wall,	4,763	35
Ditto outer slope wall,	21,056	85
Ditto sundries not included in contracts,	787	00
Ditto inner slope wall,	2,396	76
Ditto grubbing and clearing,	256	50
Ditto making roads,	15,791	90
Ditto aqueducts	2,502	25
Ditto culverts,	729	25
Ditto locks,	56,826	95
Ditto bridges, exclusive of embankments,	3,950	00
Ditto waste weirs,	4,509	00
Ditto fencing the canal,	12,081	88
Ditto guard gates,	1,464	00
Ditto head gates,	2,200	00
Ditto feeder from Berry's falls to lock No. 4,	9,994	00
Ditto feeder and dam at section No. 26,	1,808	00
Ditto dam on Shamokin ripples,	1,193	30

Total cost of lock houses and toll house.	5,038	00
Ditto bridge over Susquehanna river,	45,045	38
Ditto outlet of canal including bailing and excavation of lock pit and basin.	4,304	32
Ditto turnpiking bridge embankment at Huling's ferry,	192	00
Ditto wooden lock at Penns creek,	2,200	00
Ditto culvert embankment,	855	00
	$ 284,499	93

As the expense of completing this division of the canal will be more than was estimated on the 23d November, 1827, it will be proper to remark, that at that time, the canal was only located "from the head of Duncan's island to the west branch of the Susquehanna river," since which it has been extended two and a quarter miles farther, to Clark's ferry, embracing 21½ feet of lockage and the tow path bridge, which makes an additional expense of $ 126,078 32

Add for toll and lock houses,	7,300	00
Ditto for side cut and lock at Penn's creek,	3,200	00
Amount not before estimated,	136,578	32

Besides this additional sum, the cost of completing the canal has been considerably increased by new contracts for a great portion of the work; by more rock and hardpan having been found, than was estimated; by some alterations which were thought necessary, such as increasing the length of the aqueduct over Middle creek; by substituting two aqueducts in the place of culverts and by constructing a feeder on section No. 26.

All which is respectfully submitted,

SIMEON GUILFORD,

Engineer.

No. 14.

Statement of damages agreed to be paid, or assessed within the year ending November 3, 1828, on the Susquehanna Division.

Statement of the amount of damages agreed to be paid to individuals, or assessed in favor of individuals, against the state on the Susquehanna Division of the Pennsylvania canal, during the year preceding the first Monday in November, 1828.

Date of agreement, 1827		Dolls.	cts.	When paid.
Nov. 5.	To H. W. Snyder, for injury to his mills and lot on the Isle of Que, inclusive of all damages to his property "in any shape whatever,"	1,700	00	1827 Nov. 5.

Date of Agreement. 1827.		Dolls.	cts.	When paid.
Nov. 15.	Peter Ritner, for the removal of buildings on section No. 20, and of fences on his farm, interfering with the canal, inclusive of damages to any of his property,	200	00	1828 Apl. 15.
Nov. 16.	Lewis Dewart, for injury to a piece of buck wheat,	18	00	1827 Nov. 16.
Nov. 16.	B. L. M'Carty, for removing a stable on section 41,	15	00	1827 Nov. 16.
Dec. 11.	L. B. Stoughton, for the removal and re-erection of Henry Seachrist's house on section 39,	475	00	1828 May 19
1828 Jan. 18.	Philip Arnold, for the removal of two stables, pig-pen, corn-crib and bake-oven, on section 43,	25	00	1828 Apl. 15.
Jan. 18.	William Sholley, for the removal of his smith shop and bake oven on section 49,	20	00	1828 Nov. 15.
Jan. 18.	George Kerstetter, for the removal of a two story house and smith shop, and digging of a new well in place of the one destroyed by the canal on section 50,	250	00	1828 Apl. 18
Jan. 25.	Benjamin L. M'Carty, for the removal of a stable on section 44,	55	00	Apl. 18.
Feb. 21.	Martha Musselman, for the destruction of a crop of buck wheat and a patch of potatoes, and other incumbrances in 1827, on section 26,	18	00	1828 Feb. 21.
Feb. 21.	Jonathan Rafter, for a lot of ground taken up by the canal in Perry county, (on contract entered into the 20th September, 1827,)	175	00	1828 Mar. 15.
Mar. 28.	Barbara Dubbs, for one acre of ground in fee simple, buildings, fences, &c. removed at her expense,	550	00	1828 Apl. 18.
Mar. 28.	Allen & Co. for removal of buildings on section 27,	50	00	1828 Apl. 15.
Apl. 17.	Abraham Blaser, for removal of spring house out of track of canal on section 47, $35 00			
	For placing bored logs to carry the spring-water under the canal on section 47, $25 00			
	For removing fence on section 48, $15 00			
		75	00	1828 Aug. 1

Date of Agreement. 1828		Dolls.	cts.	When paid
Apl. 17.	Samuel Witmer, for the destruction of his still house on section 53, one tenement and a stable on section 54,	200	00	1828 Sep. 15.
Apl. 24	Robert Fox, for the removal of a dwelling house and part of a lot taken up by the canal,	150	00	1828 July 15.
May 15.	J. Cake, for the removal of buildings on section 44,	35	00	1828 May 15.
June 14.	Frazier Montgomery, for a temporary fence to protect his crops, while the canal and road were making through his farm,	22	12	1828 June 12.
July 15.	George Tharp, for the removal of a large hog-stye belonging to his distillery on section 25, inclusive of part of a lot taken up by the canal and all damages to his property,	225	00	1828 Sep. 15.
July 19.	William Rough, for the destruction of his saw mill on section 38,	200	00	1228 Nov. 15.
July 23.	Henry Bowman, in full for damages to all his property on section 5,	175	00	1828 Sep. 15.
July 23.	Henry Frank, for damages to his garden, &c. and inconvenience during removal of house on Duncan's Island	20	00	1828 Aug. 15.
July 25.	Benjamin L. M'Carty, for the building of an oven, in place of one destroyed by the construction of the canal on section 41,	10	00	1828 Aug. 15.
Aug. 14.	Ephraim Baldwin, for the removal of, and re-erection of a barn and farm house on section 1 on Duncan's island,	465	00	1828 Oct. 16.
Aug. 15.	Abraham Miller, for the removal of fences on section 4,	24	03	1828 Aug. 15.
Aug. 21.	George Herold, for water-pipes and laying them down, to convey the water from his spring on section 46, under the canal to the opposite side,	25	00	1828 Sep. 15.
Aug. 21.	Eli Russel, for the removal of two houses on section 5,	150	00	1828 June 15.
Sep. 15.	W. Linton, for the removal of fences on section 5,	5	00	1828 Sep. 15.
Sep. 15	Rebecca H. Duncan, for the removal of fences on section 5,	20	40	1828 Sep. 17.
Oct. 8.	Martin Weaver, for the removal of fences and putting up of fence on section 63,	25		1828 Sep. 15

Oct. 28	L. Hodge, for the removal and re-erection of a barn on section 50,	1828 55 00	Unpaid.
		$5,032 55	

In addition to the foregoing, a contract has been entered into on the 30th October, 1828, with James Dill, for the construction of a well, for the use of Mr. Sherman, on section No. 31, in place of the one destroyed for him by the canal, at the rate of two dollars a foot in depth for that part which may be denominated earth excavation, and for that part which may be denominated rock, four dollars and fifty cents a foot in depth, to be paid on monthly estimates of the engineer, except 20 per cent. retainable as security until completed.

C. MOWRY,
Acting Canal Commissioner.

Pennsylvania Canal Office,
Liverpool, November 3, 1828.

No. 15.

SUSQUEHANNA DIVISION.—No. 3.

List of Engineers, Superintendants, &c. on the Susquehanna Division.

List of the names of all superintendents, engineers, assistant engineers and clerks, employed on the Susquehanna division of the Pennsylvania canal, with the amount of wages or salary of each, during the year preceding the first Monday in November, 1828.

Charles Mowry, acting commissioner, three dollars per day: not paid on the Susquehanna division, while engaged on the eastern nor during the session of the board.

Simeon Guilford, engineer two thousand dollars per annum.

Hother Hage, assistant engineer, sixty dollars a month, until May 31st, 1828.

Hother Hage, principal assistant engineer, four dollars a day, from June 1st, 1828.

John A. Byers, assistant engineer, sixty dollars a month, until May 31st, 1828.

John A. Byers, principal assistant engineer, two dollars and seventy-five cents a day, from June 1st, 1828.

F. H. Petrie, assistant engineer, sixty dollars a month, until June 18th, 1828, when transferred to the North Branch division.

F. W. Leopold, clerk of the works, two dollars a day, until Dec. 24th, 1827, from December 25th, 1827.—Not paid on the Susquehanna division, while engaged on the eastern.

Samuel Gillis, superintendent of the mechanical work, two dollars and fifty cents a day, from July 18th, 1828.

Martin Keperling, superintendent of masonry at lock 11, one dollar and fifty cents a day, from August 22, until September 15, 1828.

Stephen Stafford, superintendent at locks, 7 and 8, two dollars a day, from October 6, 1828.

John H. Hopkins, target man, one dollar and fifty cents a day, until May 31, 1828.

John H. Hopkins, sub-assistant engineer, two dollars a day, from June 1, 1828.

Franklin Wright, target man, one dollar and fifty cents a day, until May 31, 1828.

Franklin Wright, sub-assistant engineer, two dollars a day, from June 1, 1828.

James Warford, target man, one dollar and fifty cents a day, until May 31, 1828.

James Warford, sub-assistant engineer, two dollars a day, from June 1, 1828.

E. Wheelock, target man, one dollar and fifty cents a day, from June 25, 1828.

Charles O. Sanford, draftsman, one dollar a day, for thirty-three days previous to March 15, 1828.

Do. do. one dollar aud fifty cents a day, from March 16th to May 31, 1828.

Do. do. two dollars a day, from June 1, 1828.

William Petrie, chainman, one dollar a day, until June 28, 1828, when transferred to the North Branch division.

Julius A. Jeger, chainman, one dollar a day, until May 31, 1828.

Do. target man, one dollar and fifty cents a day, from June 1, 1828.

George R. Mowry, chain-man, one dollar a day, until May 31, 1828.

Do. target man, one dollar and fifty cents a day, from June 1, 1828.

William Bower, jr. axe man, one dollar a day.

Richard Lloyd, do. one dollar a day.

Isaac High, do. one dollar a day, until July 30, 1828.

Nathan Kinsman, jr. do. one dollar a day, from July 31, 1828.

C. MOWRY,
Acting canal commissioner.

Pennsylvania Canal Office,
November 3, 1828.

No. 16.

SUSQUEHANNA DIVISION, NO. 5.

Statement of Engineering and miscellaneous expenses on the Susquehanna Division.

Statement of expenses paid on the Susquehanna division of the Pennsylvania canal, from December 15th, 1827, until December 1st, 1827.

Salaries to			Dolls.	cts.
Charles Mowry, acting commissioner, 168 days from June 1st, 1828, to May 31st, 1828, at $3 per day			504	00
Simeon Guilford engineer, three quarters, from August 4th, 1827, to May 3d, 1828, at $2000 per annum			1,500	00
Hother Hage, for six and a half months as assistant engineer, at $60 per month,	390	00		
168 days as principal assistant engineer at $4	672	00		
			1,062	00
F. W. Leopold, clerk, 20 days at two dollars per day, to December 24, 1827,	40	00		
from December 25, 1827, 252 days at 2 50 a day, to Nov. 15, 1828.	655	00		
			695	00
J. A. Byers, 6 months and 9 days as assistant engineer at sixty dollars per month	392	00		
on account of salary as principal assistant engineer, from June 1, 1828, at 2 75 a day,	266	00		
			658	00
F. H. Petrie, 6 months 9 days as assistant engineer, at sixty dollars per month			378	00
James Warford, 198 days as target man at 1 50 a day	297	00		
168 days as assistant engineer, at $2 a day,	336	00		
			633	00
J. H. Hopkins, 198 days as target man at 1 50 a day	297	00		
168 days as assistant engineer at 2 a day	336	00		
			633	00
Franklin Wright, 185 days as target man, at 1 50 a day	277	50		
168 days as assistant engineer at $2 a day	336	00		
			613	50
Charles O. Sanford, 32 days as drafts-man at $1 a day	32	00		
94½ days do. at $1 50 a day	111	00		
168 days do. at 2 a day	326	00		
			469	00

William Petrie, 171 days as chain-man at $1 a day	171 00	
28 days, as target man at 1 50 a day	42 00	
		213 00
Julius A. Jeger, 170 days as chainman at $1 a day	170 00	
137 days as target man at 1 50 a day	205 50	
		375 50
Geo. R. Mowry, 171 days as chainman at $1 a day	171 00	
137 days as target man at 1 50 a day	205 50	
		376 50
E. Wheelock, 112 days as target man at 1 50 a day		168 00
Samuel Gillis, on account as superintendant of mechanical work from July 1828, at 2 50 a day		90 00
Martin Keper'ing, superintendant of masonry, 22 days at 1 50 cents a day		33 00
Michael Bower, junior, 287 days as axeman at $1 a day		287 00
Isaac High, 221 days, to July 30th, 1828, at $1 a day		221 00
Richard Lloyd, 300 days as axeman, at $1 a day		300 00
Nathan Kinman, 66 days as axeman, from July 31 to October 4, 1828		66 00
Engineering instruments and for repairs of instruments		113 30
Printing and advertising		216 78
Stationary and book binding		141 55
Postage and transportation of books and papers		68 68
Office rent		50 00
Office furniture		43 03
Fuel, candles and oil		30 95
A skiff, used in construction of Shamokin dam		8 00
Hire of hands in locating Shamokin dam		9 00
		$9,956 79

CHARLES MOWRY,
Acting canal commissioner.

Pennsylvania canal office,
Liverpool, December 1st, 1828

Series 5.

No. 1.

REPORT of the superintendent on the Delaware division, of the Pennsylvania canal, 20th November, 1828, and documents annexed thereto.

To the board of canal commisioners of Pennsylvania.

GENTLEMEN,

In making out the annual report of the Delaware division of the Pennsylvania canal, which I have the honor to lay before you, my attention has been directed chiefly to the following points:

1. To exhibit a detailed report of the present situation of the work, with the amount of monies paid on contracts.

2. The amount of damages paid to individuals.

3. A list of all engineers, superintendents, assistant engineers, and clerks employed on the division, with the wages of each.

The tabular statements marked A. B. C. D and E. showing the several kinds of work, the contractor's names, contract prices, quantities of work done, amount of monies retained to ensure the completion of the work, and the amount paid on each contract, it is believed will exhibit a view of the present situation of the work in the most concise and satisfactory manner that could be adopted.

Statement F. shows the amount of damages paid from the commencement of the work up to the present time, to whom, and as far as the limits of a tabular statement will admit, on what account. No suits for damages have yet been brought.

Statement G. exhibits the organization of the engineer department, and of persons employed on the line.

The statement of Mr. Sargent, the engineer on this division, annexed to this report, and marked H. shows the probable amount of work remaining to be done, with an estimate of what the same will cost at contract prices. I have also added a general recapitulation of the whole, to which is annexed a comparison between the original estimate of the engineer and the amount at contract prices, with a view to conform as nearly as possible with the requisition of the fourth section of the act of 16th of April, 1827.

By a reference to the aforesaid statements, it will be seen that since the 13th October, 1827, 106 sections of about half a mile each, making nearly 53½ miles of canal, together with the basin at Bristol, and all the mechanical work of every description, with the exception of houses for the accommodation of lock-keepers, have been contracted for; 37 of those sections have been completed in a handsome and satisfactory manner, and the remainder as far as section 87, are progressing with steadiness and energy; those let on the 18th of the present month, see statement D. will be commenced immediately.

With the exception of six waste wiers, which are completed, see statement E. and some work on culverts and bridge abutments, nothing has yet been paid on account of any part of the mechanical

work, that has been let at different times through the summer, and the necessity of procuring suitable timber for every part thereof, from the country up the Delaware, rendered it indispensable that the contractors should have it in their power to avail themselves of the spring freshet in the river for that purpose; it was therefore, distinctly stipulated at the time of making the contracts, that all the materials should be procured this fall and winter, so that the work might be commenced on the line as early next spring as the season would admit of.

About six miles, with the mechanical work on it, only remains to extend the line from Bristol to Easton; that will be advertised for contract whenever the board see proper to direct it to be done.

In closing this report it gives me no small pleasure to state, that with the exception of the prevalence of sickness to a very unusual degree in the neighbourhood, throughout the latter part of the summer, and in which the engineer corps have suffered severely, so far, the steady and uniform progress of the work has been impeded by but few of those difficulties generally attendant upon works of its magnitude. No losses or extra expense have in any case occurred to the state, and but rarely to individuals; for although the prices at which the work has been contracted for and executed, are justly esteemed low, yet by persevering industry and rigid economy, the contractors have, with one or two trifling exceptions, been able to complete their jobs in a workmanlike and satisfactory manner. Indeed, it is due to them and to the hands employed on the line, to state distinctly, that their uniform good conduct has happily dissipated those unpleasant apprehensions which not a few entertained, previously to the commencement of the work, and been the means of allaying many of the prejudices against it.

Respectfully submitted,

TH. G. KENNEDY.
Superintendent.

Canal Office, Delaware Division,
November 20, 1828.

No. 7.

STATEMENT F. DAMAGES.

	Amount.
Robert H. Scott, for about ¼ of an acre of his lot in Falls township, occupied by the canal, temporary damages included	$ 12 50
Samuel Vaughn, for the canal passing diagonally through his tavern lot in Tyburn, and the destruction of about 3 acres of rye,	208
Cornelius Slack, jr. for the destruction of part of a field of rye, injury done to fences, removing do. and in lieu of a temporary bridge,	17 50

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STATEMENT exhibiting the present situations of Sections 1 to 106, inclusive.

STATEMENT A.

LET AT BRISTOL, October 15, 1828.

Contractors Names.	No. of Section.	CONTRACT PRICES. Per Cubic Yard. Grubbing & clearing	Excavat'n	Embank't	Rock: Soil & loose stone	Stone rock	Hard pan	Surplus	Perch. Vert. wall	Perch. Outer slope wall	Perch. Inside do	QUANTITIES OF WORK DONE. Grubbing & Clearing	Excavation	Embankm't	Soil rock	Stone rock	Hard pan	CASH ACCOUNT. Vertical wall	Outer slope wall	Amount retained	Amount paid	REMARKS.
		Dolls.	Cts.	Cts	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Cts.	Dolls.	Cubic Yards.					Perches.		Dolls. | Cts.	Dolls.	Cts.	
Morris, Dorrance and Sprague	1		7	7																		Not commenced
John L. Bevens	2	25	7½	9½		35						25	12,854	3,393		40					1357	70	Completed
Morris, Cook and Co	3	25	8	8		50						25	12,196	6,302		10					1309	84	do
Jedediah Beckwith	4	30	8	12½				25				30	12,291	1,042							1260	53	do
do	5	40	8	12½				25				40	12,212	200			3668				1302	71	do
Daniel Thomas	6	65	7½	12½				25				65	9,804	2,510			1843				1202	71	do
John L. Bevens	7	25	7½	11		35						26	13,912	4,871		10	856				1285	93	do
Daniel Thomas	8		7½	12½								25	9,855	7,619							1466	71	do
Morris, Cook and Co	9	15	7	7		50		25				15	11,206	3,451		20	500				1756	50	do
do	10	15	7	7							50	15	13,250	1,112							1175	99	do
Daniel Thomas	11		7½	10½								90	14,488	4,241				25			1172	84	do
Swain and Downing	12		7½	12½				23					11,815	5,010			135				1706	72	do
John Gray	13	10	9	16		25		25				10	24,689	340		24	282				1543	42	do
Thomas M. and James R. Scott	14	25	7½	12		50						25	16,582	3,008		25					2357	37	do
Thomas M. Scott	15	15	7½	12		50		15				15	23,075	2,050		37	500				1621	61	do
James R. Scott	16	5	7½	12½		50		15				5	17,543	3,475		75	1357				2152	65	do
do	17		7½	do		55							14,325	750		440					2037	56	do
do	18	15	7½	do		50		15	100			15	15,456	1,569		84	3714				1562	77	do
Morris, Cook and Co	19	500	12	12		50		25				300	9,886	2,551		802	7191	224			1960	02	do
John Gray	20	25	11	16		60		23	100				14,738			2014	2015			445 08	4197	69	do
Christopher Midler	21	25	9½	11		60		16				25	9,202	12,872		668	230	1732			2846	65	ab't two-thirds do
Morris, Cook and Co	22	50	9	9		50		25					5,788	11,885		1109	412			217 71	4497	36	completed
Christopher Midler	23	50	9	11		60						50	7,201	15,976		117					2525	65	completed
Blackstock and Moore	24	150	7	12½								150	5,096	28,293							4043	34	do
Morris, Cook and Co	25	150	10	10		50						150	13,540	3,617		405					2080	20	do
Blackstock and Moore	26	150	8½	12½								150	6,945	5,456							1041	88	do
Morris, Cook and Co	27	25	9			50		25				25	6,551			20	284				675	79	do
do	28	65	9			50		25				65	11,695			30	509				1857	55	do
do	29	10	8			50						10	16,006			159					1369	98	do
do	30	120	10			50		25				120	18,166			20	1160				2236	60	do
do	31	200	10			50		25				200	12,996			212	2497				2229	85	do
Barker, Smith and M'Allister	32	100	8½	11		42						100	10,245	4,293		75					1475	10	do
do	33	65	8½	11								65	9,380	2,383							1124	43	do
do	34	70	8½	11		42		18½		87½		70	10,947	2,993		133					1654	79	do
Patrick Mulvaney	35	155	8	14		45						155	10,117	7,068		330					2097	88	do
do	36	155	8	14		45	18			50		155	12,202	6,202		5856	319		150		4826	06	do

STATEMENT B.

LET AT NEW-HOPE, May 20, 1828.

Bird and Sutton	37	90	7½	7½		40		20				90	14,856	3166		20	1070				1661	65	do
Charles F. Jineback	38	100	7	9		42	22	18				65	10,718				500		100		769	26	nearly do
Thomas and Patrick Moore	39	10	7	7½								10	12,258	7941							1465	63	completed
Bird and Sutton	40	50	7	7½		35	28	22				50	7,231			72	427		50		604	61	about half do
Abeel and Johnson	41	50	6½	12½		50	29	18				50	20,151				160				1548	61	completed
Hackley, Townsend and Co	42	250	9	9		45		23			73	175	24,980	940		119		3258	747	44	4171	65	ab't two thirds do
Barker, Smith and M'Allister	43	150	8	10		40	51½	25		87½	87½	150	24,030	262		75		5650	900		4482	54	ab't three-fourths do
Brittin and Bishop	44	50	7	10		60	40	37				25	11,188	2173		9			180		830	68	ab't two-thirds do
Barker and Eglelston	45	125	7	11		50	25	25				125	13,292	2451							1323	05	completed
Morris and Chadsey	46	E	7	12		50	30	25															not commenced
Morris and Brown	47	E	8	9		50	30	25			90	100	14,495	420			912	2786	760		3272	80	about ¾ done
Thomas and Patrick Moore	48	75	8	10		50		18		50	35	75	12,909	120		41	2165	3023	480		2719	77	do
Patrick Mulvaney	49	55	8	10		45	18½	12½			55	55	14,957	1690		20	3054	614	337		1651	71	about ¾ do

STATEMENT C.

LET AT NEW-HOPE, Sep. 16, 1828.

Murray, Coryell and Co	50	20	8	12½		40						20	3020	655							343	47	commenced
James R. Scott	51	30	8	9		50	35	25															do
do	52	200	9	10		50	55	25															do
Barker and Wallace	53	50	7	12				25					1700										do
Philip Reilley and Co	54		8	10		35	19	15									259				20	161	50	do
Andrew Boyle	55	40	7	7		37½	20	12½					2350										do
Patrick Murphey	56	30	7	10		40	20	18					2500								30	169	50	do
Corns. D. O'Herring	57	60	7½	9		50		18			56		4300								20	145	00	do
William Weller	58		9	12		50						100	4360								60	262	50	do
Robert Blackstock	59	225	9	10		45		20				100	1000								75	455	40	do
do	60	300			37½																10	180		do
Morris, Dorrance and Smith	61	300			25				60	60													do
Patrick Moore	62	100	9	12½		44	22	20		45	60	17											do
Barker and Downing	63	150	8	11		45					73												do
Carmichael and Hinsdale	64	200	10	12½		50		18		48													do
Isaac Otis	65	600			25				25														do
Smith and Duffey	66	150	7	9		40							766								53	62	do
Morris, Dorrance and Hough	67	100	9	9½									2886								50	209	74	do
Joel Cheston	68	50	7	7		50		20					1698									118	86	do
Barker and Downing	69	25	7½	11		45							1162									87	15	do
do	70				24				50	60	60				325								do
Mills and Powers	71	200			24				26	55									60		10	100	40	do
do	72	50	7	10		40																	do
Philip Reilly and Co	73		8	12		40	20	14															do
Abraham Vanhora and Co	74		9	12		45	25	20															do
Smith and Duffey	75		8	12		42	15	17															do
Levi Lee and Co	76	75	8	12				20															do
Patrick Mulvaney	77		9	16								100	8825										do
do	78		9	16								85									100	794	07	do
William Weller	79		7½	10									704								10	77	80	not commenced
Patrick and Daniel Reilley	80	80	8	8½		56	25	23					4502	249							70	295	52	commenced
Moylan and Sullivan	81	5	7½	9		45	25	12½															do
do	82		7	9		40	25	12½					2917										do
Patrick Murphey	83	200	8	8		40	18	18													40	164	19	do
Morris, Dorrance and Hunt	84	250	8	8		50		25															do
Joshua B. Calvin	85	50	9										3512										not commenced
do	86	50	10	10																		298	08	commenced

STATEMENT D.

LET AT EASTON, Nov. 18, 1828.

John Bird	87		12½	12½																		
James R. Scott	88		8	8				25														
do	89		7	7				25														
William Erwin	90		7½	12																		
Patrick and Daniel Reilly	91	30	8	12				25														
do	92		8	12				23														
William Weller	95	100	8	8	20	30		18		50			11 chains of this section to be measured as sections 60, 61, &c.									
Charles Pettit	94				20					48			All of this section		do	do						
do	95				23					45			do	do		do						
Smith and Pitcher	96		7½		23						60		8 chains do		do	do						
Jacob Kintner	97	15	7½																			
Hitchcock and Stone	98	50	9																			
do	99	100	8	9	25					45			15 chains do		do	do						
Smith and M'Allister	100	15	9	10		50		20														
Coyle and Riley	101		7	6½																		
do	102		7	7																		
Joseph N. Hough	103	150	7½	11						40												
James M. Porter	104	175	do	7½	28	40	30	20		49	60		20 chains do		do	do						
Dougherty and Earnet	105	150			18					49	49		23 do do		do	do						
Christopher Midler	106	250	7			45	30	15		60												

NOTE—Section 1, will be commenced next spring, and worked at the same time with the basin and pier at Bristol. Section 18 was originally let at 7 cents for excavation, and 2402 cubic yards excavated at that price, on which $35 65 were retained; it was then abandoned and re-let at 7½, and the sum retained forfeited. On section 23 it was necessary to construct a small temporary bridge which cost $5, that sum is included in the cost of that section. The contractors on section 34 were paid $20 for removing two buildings from the line of canal, and $63 83 for procuring and placing a trunk under the canal to pass the water from Harvey's spring; those sums viz: $25 83 are included in the amount of $1634 79.

Section 49 extends to near New-Hope.

Wherever the price for any item of work is left blank in this or any of the annexed statements, should any work of the kind occur on the section, it is stipulated in the contracts to be paid for at the estimate of the engineer In consequence of the peculiar formation of the ground, sections 60, 61, 65, 70 and 71 have been let and contracted for thus, "For constructing the towing bank, and lining the canal with good water tight earth, including all excavation of rock, earth, small stones or gravel that may occur on the whole section or road along the same where it is necessary to be rebuilt, to be measured in the banks per cubic yard."

NOTE—Sections 103 and 106 are each ¾ of a mile. Section 104 crosses the line between Bucks and Northampton counties. Sections 93, 94, 95 and 96 pass the Nockamixon narrows. Sections 104 and 105 pass Rocky falls.

ASIN, PIER & TIDE LOCK AT BRISTOL.

& Sprague, Contractors.

	Contract Prices.
ier per square foot,	$0 19½
h good water tight earth, per cubic yard,	9
in, inside,	9
ock, in cement, per perch of 25 cubic feet,	5
it and outside pier, in tide water, including pumping and bailing ns and all other devices necessary to execute the same, per cubic timate of the engineer.	
ork of tide lock, complete at the estimate of the engineer.	
, per cwt.	10

ctors.	Masonry.	d & Iron work mplete.	Excavation.	Embankment.	mount retained.	mount paid.
RIDGES.						
	1 45	220	12	12	16	59
BRIDGES.						
22 do each	1 45	215	12	12	121	514 64
co. 1 do	1 45	200	12½	12½		
1 do	E	E	E	E		
co 8 do	1 45	200	12½	12½		
7 do	1 50	180	12½	12½		
GES.						
28 do each		125	12	12		
1 do		150	9	12½		
1 do		150	9	do		
18 do each		150	9	do		
2 do do		150	E	do		
GES.						
3 do each		E	E	E		

AQUEDUCTS.

Names of Contractors.	No. of the Aqueduct	Span, in the clear.	Contract Prices. Perches. Masonry in cements.	Perches. Trunks, per foot lineal.	Cubic Yard. Excavation.	Embankment.	Puddling.	Perches. Slope wall.	Location.
		Feet.			Cts	Cts	Cts	Cts	
Morris & Dorrance	1	25	$3 62½	$21	12½	14	15	60	Yardleyville
do do	2	75	2 50	10 50	E	E	E	E	Hough's creek
do do	3	28	2 75	20	18½	15	25	E	Knowle's do
Murray, Corvell & co.	4	50	E	16 50	E	E	E	E	New Hope
Morris, Dorrance & Cowell	5	50	2 50	16	E	E	25	1 50	Milton creek
do do	6	100	2 50	14 50	E	E	25	1 50	Tohicon do
do do	7	75	2 50	16	E	E	25	1 50	Tinicum do
Jacob Kintner & co.	8	28	2 75	17	E	E	E	E	Gallows run
Thomas & Richard English	9	50	2 87½	10	9	12½	16	E	Durham creek

CULVERTS.

Names of Contractors.	No. of Culverts.	Chord.	Perches Masonry cement.	Contract Prices. Foundation, sheet piling, &c.	Cubic Yard. Excavation.	Embankment.	Puddling.	Cash Account. Amount retained.	Amount paid.
		Feet.		Dolls	Cts	Cts	Cts	Dolls	
David M'Lellan & co.	1	8	$3 12½	373	12½	14	15		
do	2	12	3 12½	573	do	14	15	8	92
do	3	5	3	180	do	14	15		12 75
do	4	5	3	187	do	14	15	15	91 62
do	5	8	3	160	do	14	15	15	78 47
do	6	5	3	150	do	14	15	15	72 62
do	7	8	3	210	do	14	15	27	104 37
do	8	5	2 75	152	do	14	15	10	36 50
Barker, Smith & co.	9	5	2 87½	E	20	13	25		
Murray, Coryell & co.	10	8	2 50	200	12½	14	15		140 75
David M'Lellan & co	11	5	2 50	170	10	12½	15		
do	12	12	2 50	253	10	do	15		
do	13	8	2 50	170	10	do	15		
do	14	12	2 50	253	10	do	15		
do	15	8	2 50	200	10	do	15		
do	16	12	2 75	255	10	do	15		
do	17	5	2 50	200	10	do	15		
do	18	8	2 75	170	10	do	15		
do	19	16	3	330	12½	do	15		

LOCKS.

Names of Contractors	No. of the Lock.	Lift.	Perch. Masonry in cement.	Perch. Masonry dry work	Contract Prices. cwt. Wood work completed.	cwt. Iron work.	Cubic yard. Excavation.	Embankment.	Puddling.	Location.
		Feet.					Cts.	Cts.	Cts	
Morris, Dorrance & Sprague	1	6.68	3		1 50	$950	$12	12½	25	Sec. 1
do	2	7	3		1 50	950	12	do	do	25 do
do	3	6.32	3		1 50	950	12	do	do	25 do
Charles Cook & co.	4	6	3		1 50	950	12	do	do	25 Sec. 6
do	5	6	2 60	E	E	E	12	12	E	28
do	6	6	2 60	E	E	E	12	12	E	51
do	7	8	2 60	E	E	E	12	12	E	32
Morris, Dorrance & Sprague	8	6.94	2 50	2	1150		E	E	25	49
do	9	6.94	2 50	2	1150		E	E	25	do
Murray, Coryell & co.	10	8	2 50	2	1150		E	E	E	50
do	11	8	2 50	2	1150		E	E	E	do
David M'Lellan & co.	12	5.87	2 62½	87½	1012	10	10	12½	15	69
do	13	6	2 50	82	1002	10	10	do	15	66
Morris, Dorrance & Cowell	14	9	2 50	1 50	1150		E	E	E	do
Cook, Delano & Ellwood	15	6	2 60	87½	1000		12½	15	40	72
do	16	6	2 60	87½	1000		do	15	40	do
David M'Lellan & co	17	6	2 75	87½	1002	10	10	12½	15	74
Mills & Powers 2	18	10	3 12½	1 50	1000		13	15	20	81
do	19	6	2 93	1 25	1200		12½	15	18	85
do	20	8	2 70	E	1200		E	E	E	95
do	21	9	2 80	E	1200		E	E	E	100

BASIN, PIER & TIDE LOCK AT BRISTOL.

Morris, Dorrance & Sprague, Contractors.

	Contract Prices.
Wood work of Pier per square foot,	$0 19
Filling in pier with good water tight earth, per cubic yard,	9
Excavation of basin, inside,	9
Masonry of tide lock, in cement, per perch of 25 cubic feet,	5
Excavating lock-pit and outside pier, in tide water, including pumping and bailing water, coffer dams and all other devices necessary to execute the same, per cubic yard, at the estimate of the engineer.	
Wood and Iron work of tide lock, complete at the estimate of the engineer.	
Iron work of pier, per cwt.	10

WASTE WIERS.

Names of Contractors.	No. of the Waste Wier.	Contract Prices. Per cubic yard. Wood & Iron work complete	Excavation	Embankment.	Puddling.	Hard pan.	Cash account. Amount retained.	Amount paid.
Morris, Dorrance & Sprague	1	145	10	10	50			200 62
do do	2	145	10	10	50			167 80
do do	3	145	10	10	50			170 80
do do	4	145	10	10	50			176 70
do do	5	143	10	10	50			177
do do	6	145	10	10	50			177
do do	7	145	10	10	50			550 60
Thomas & Richard English	8	140	7	10	E	10		
do do	9	140	7	10	E	10		
do do	10	140	7	10	E	10		
do do	11	140	7	10	E	10		
do do	12	140	7	10	E	10		
do do	13	140	7	10	E	10		
do do	14	140	7	10	E	10		
do do	15	140	7	10	E	10		
do do	16	129	7	10	E			
do do	17	do	7	10	E			
do do	18	do	7	10	E			

Wastes Wier No. 2 to 7 inclusive, are completed.

FENCING.

Downing, Wood & Barker, Contractors for Fencing from Bristol to Centre bridge on section 57, about 28 miles, at 73 cents per rod, running measure.

Jacob Kintner, Contractor for Fencing from Centre bridge, to the termination of section 86, about 15 miles, at 73 cents per rod, running measure.

Jacob Kintner, Contractor for Fencing from the commencement of section 87, to the termination of section 106, about 10¼ miles, at 75 cents per rod, running measure, subject to certain agreements with the owners of lands.

BRIDGES.

Names of Contractors.	Contract prices. Perch. Masonry.	Cubic yard Wood & Iron work complete.	Excavation.	Embankment.	Cash account. Amount retained.	Amount paid.
8 TURNPIKE BRIDGES.						
Morris & Smith	1 45	220	12	12	16	59
29 COMMON ROAD BRIDGES.						
Morris & Smith 22 do each	1 45	215	12	12	121	514 64
Murray, Coryell & co. 1 do	1 45	200	12½	12½		
Daniel Sullday 1 do	E	E	E	E		
Morris, Dorrance & co 8 do	1 45	200	12½	12½		
Cowell & Weller 7 do	1 50	180	12½	12½		
60 FARM BRIDGES.						
Morris & Smith 28 do each		123	12	12		
Murray, Coryell & co 1 do		150	9	12½		
William Kitchin 1 do		150	9	do		
Trump, Hull & co 18 do each		150	9	do		
Cowell & Weller 12 do do		150	E	do		
3 FOOT BRIDGES.						
Morris & Smith 3 do each		E	E	E		

Benjamin Albertson, for 4 a. 130 p. of his farm in Falls township, occupied by the canal; temporary damages included,	$ 240 62½
Heirs of Dr. A. Gregg, for ¾ of an acre in Bristol, occupied by the canal—33 perches cut off and purchased in fee—injury done to orchard, fences, &c.	150
Joseph Stackhouse, for about 2¾ acres of his farm in Bristol occupied by the canal; destruction of wheat crop, and other temporary damages,	310
William Kinsey, for about 48 perches of his lot in Bristol, occupied by the canal, and 109 perches cut off and purchased in fee	100
Benjamin Wright, for about 122 perches of his farm in Bristol, occupied by the canal, and 35 perches as a roadway—destruction of rye crop included,	65
Hannah Mason, for the entire destruction of her garden and the produce of an acre of ground in Falls township,	15
John Russell, for the destruction of his garden and the removal of fences, &c. on the farm he occupies in U. Makefield,	20
Abraham Slack, for the removal of fences and injury done to crops on the farm he occupies in L. Makefield,	13 50
Abner Harvey, for the removal of fences and injury done to crops on the farm he occupies in U. Makefield,	20
Abraham Swain, for about 1 a. 128 perches of his farm in Bristol, occupied by the canal, and releasing his claim to a bridge,	95
George White, for erecting a temporary bridge across the canal on his lot in Yardleyville,	2 75
Thomas Runyan, for removing his dwelling house, shop, &c. and the occupancy of greater part of his two lots in Morrisville,	250
Jacob L. Walton, in lieu of a farm bridge, $175, and of 187 rods of fencing at 75 cts—he releasing the state forever,	315 25
William Paff, in lieu of a farm bridge, $225, and of 236 rods of fencing at 75 cts.—he releasing the state forever,	402
Mahlon Yardley, in lieu of 229 rods of fencing at 75 cts. per rod—he releasing the state forever,	171 75
George Yardley, in lieu of 289 rods of fencing at 75 cts per rod—he releasing the state forever.	216 75

Solomon Wildman, for the destruction of grass, deprivation of water and other temporary damages,	$ 10	
Cornelius Slack, senr. for the destruction of part of his wheat crop,	6	
Henry Reading, for the destruction of his garden, injury to his well, &c.	6	50
Samuel Hibbs, for about perches of his lot in Bristol, occupied by the canal, and 74 perches purchased in fee,	75	
George Grubham, for about 3 a. 66 perches of his farm in Falls, occupied by the canal, including temporary damages,	170	62½
James Johnson, conveyed to him 1 a. 56 perches of land in Bristol, purchased from the heirs of Dr. A. Gregg, William Kinsey and Samuel Hibbs, as a compensation for damages done to his farm in Bristol, by the occupancy of about the same quantity of it.		
	$2,893	75

No. 8.

STATEMENT G.

Exhibiting a list of the persons employed in the engineer department, with the wages or salary of each.

Henry G. Sargent, engineer, from 5th November, 1827, $2,000 per annum.

Emerson McIlvaine, assistant engineer, 5th Nov. 1827, to 9th April last, sixty dollars per month.

Emerson McIlvaine, principal engineer, 10th April last to 31 Oct. four dollars per day, resigned.

Frederick C. Mills, assistant engineer, 3d April to 9th April, sixty dollars per month.

Frederick C. Mills, assistant engineer, 10th April, three dollars and fifty cents per day.

James B. Sargeant, assistant engineer, 5th Nov. two dollars per day.

Charles L. Schlatter, assistant engineer, 5th Nov. two dollars per day.

Thomas Stewart, Jr. target bearer, 5th Nov. to 31st March, one dollar and fifty cents per day.

Thomas Stewart, jr. assistant engineer, 1st April, two dollars per day.

Michael S. Heaney, target bearer, 5th Nov. to 30th June, one dollar and fifty cents per day.

Michael S. Heany, assistant engineer, 1st July, two dollars per day.

Augustus W. Kennedy, assistant engineer and draftsman, 1st July, two dollars per day
John C. Stocker, assistant engineer, 4th Aug. two dollars per day.
Simpson Torbert, do. 1st Oct. two dollars per day.
Joseph B. Conard, target bearer, 9th April, one dollar and fifty cents per day.
Anthony B. Johnson, do. 15th April, one dollar and fifty cents per day.
John D. Steele, target bearer, 26th May, one dollar and fifty cents per day.
Charles Carey, target bearer, 21st July, one dollar and fifty cents per day.
Charles Heckman, target bearer, 3d June, one dollar and fifty cents per day.
James McKeen, target bearer, 4th August, one dollar and fifty cents per day.
Ralph Harrison, axeman, 5th Nov. one dollar per day.
David Kirgan, do. do. one dollar per day.
Charles G. Thomas, chain carrier and axeman, 15th April, one dollar per day.
William M. Cowell, axeman, 14th July, one dollar per day.
William W. Heany, chain carrier and axeman, 19th May to 18th Nov. one dollar per day—discontinued.
Christopher Weaver, axeman, 4th Aug. to 28th September, one dollar per day—dead.
Daniel Troxell, axeman, 30th Sept. one dollar per day.
A clerk, when necessary, 1st April, two dollars and fifty cents per day.
T. G. Kennedy, superintendant, three dollars per day.

No. 9.

STATEMENT H.

Showing the amount of work, now under contract, and remaining to be done on the Delaware division of the Pennsylvania canal, carefully estimated and calculated at contract prices.

On section,	Dolls.	Cts.
1. The basin, pier and tide lock at Bristol—lift locks No. 1, 2 and 3—culvert No. 1 turnpike bridge No. 1. fencing and all the grubbing, excavation and embankment of the section,	29,154	41
2. Road bridge No 2, and fencing,	705	39
3. Farm bridge No. 3, and fencing, culvert No 2, and waste wier No. 1,	1,614	45
4. Fencing	236	60
5. Road bridge No. 4 and 5, fencing	1,158	23
6. Road bridge No. 6 fencing and lock No. 4,	4,581	22

7. Farm bridge No 7 fencing and culvert No. 3,	1,161	69
8. Farm bridge No. 8 fencing and culvert No. 4	1,171	55
9. Farm bridge No. 9 and 10, fencing and culvert No 5	1,314	19
10. Road bridge No. 11, and fencing	648	80
11. Road bridge No. 12, fencing and culvert No. 6	1,083	27
12. Fencing and culvert No. 7	940	22
13. Road and turnpike bridge No. 13 and 14, and fencing	1,194	93
14. Farm bridge No. 15, and fencing	373	24
15. Road Bridge No. 16, and fencing	649	78
16. Farm and turnpike bridge No. 17 and 18, and fencing	1,286	80
17. Road bridge No. 19, and fencing	511	60
18. Farm bridge No. 20 and 21, and fencing	619	08
19. Road bridge No. 22, fencing	622	23
20. Road bridge No. 23, fencing and about 2985 cubic yards of very hard Rock Excavation	2,519	55
21. Road bridge No. 24, and fencing	770	79
22. Road and foot bridge No. 25 and 26 and fencing and culvert No. 8	1,202	17
23 Foot bridge No 27 fencing	860	56
24. Fencing and 100 yards of embankment at a spring run	245	60
25. Road bridge No. 28 and fencing	668	41
26. and 27. Fencing	467	20
28. Farm bridge No. 29 and fencing, and lock No. 5.	4,293	36
29. Farm and road bridge No. 30 and 31 and fencing culvert No. 9 and aqueduct No. 1	3,004	79
30. Farm bridge No. 32 and 33, and fencing	595	20
31. Road bridge No. 34 and fencing and lock No. 6	4,414	51
32. Road and farm bridge No. 35 and 36, and fencing, and lock No. 7, and some excavation and embankment at Slack's run	5,206	35
33. Road and farm bridge No. 37 and 38 and fencing, and some embankment at waste weir No. 5	962	17
34. Farm bridge No. 39 and 40 and fencing	577	92
35. Farm bridge No. 41 and fencing and aqueduct No. 2	3,355	52
36. Farm bridge No. 42 and 43 and fencing	528	72
	78,127	50
37. Farm and road bridge No. 44 and 45 and fencing	720	54
38. Farm bridge No. 46 and fencing, and some grubbing and excavation	680	51
39. Farm bridge No. 47 and 48 and fencing	555	48
40. Farm bridge No. 49 and 50, and fencing and grubbing and earth and rock excavation	1,075	18
41. Road and foot bridge No. 51 and 52, and fencing aqueduct No. 3 and 1373 cubic yards, aqueduct embankment in section	3,831	08

42. Fencing and excavation, embankment and protection wall outside	3,603	72
43. Road bridge No 53 fencing and excavation embankment and protection wall outside	4,275	83
44 Farm bridge No 54 and fencing and excavation	890	93
45 Fencing	233	60
46 Farm bridge No 55 and fencing, grubbing, excavation and embankment	1,345	50
47 Fencing, grubbing, excavation, embankment, and protection wall outside	2,390	62
48 Fencing, excavation and embankment and protection wall outside	1,572	61
49 Road bridge No 56 and fencing, locks No 8 and 9 excavation and embankment and protection wall outside	14,249	57
	35,975	17
50 Road and farm bridge No 57 and 58 and fencing locks No 10 and 11 aqueduct No 4 culvert No 10 and excavation	16,583	01
51 Road bridge No. 59 and 60 and fencing, grubbing, excavation and embankment	2,826	19
52 Road bridge No 61 and fencing, culvert No 11 and grubbing, excavation and embankment	3,856	10
53 Fencing, grubbing, excavation and embankment	1,351	60
54 Farm bridge No 62 fencing, culvert No 12 grubbing, excavation and embankment	3,005	50
55 Farm bridge No 63 and 63a fencing, grubbing, excavation and embankment	2,622	05
56 Farm bridge No 64 and fencing, grubbing, excavation and embankment	2,149	60
57 Road bridge No 65 and fencing, culvert No 13 waste weir No 8 grubbing excavation and embankment and wall outside	4,493	65
58 Farm bridge No 66 and 67 and fencing, grubbing, excavation and embankment and wall outside	4,486	69
59 Farm bridge No 68 and fencing, waste weir No 9 grubbing, excavation and embankment, and wall outside	7,706	10
60 Fencing, grubbing, excavation and embankment and wall outside	16,898	60
61 Road bridge No 69 and fencing, culvert No 14 grubbing, excavation and embankment and wall outside	18,627	60
62 Fencing, culvert No 15 and grubbing, excavation and embankment and wall outside	8,441	37
63 Farm bridge No 70 fencing, lock No 12 grubbing, excavation and embankment and wall outside	11,116	85
64 Farm bridge No 71 fencing, aqueduct No 5 grubbing, excavation and embankment and wall outside	11,769	70

65	Fencing, waste weir No 10 grubbing excavation, and embankment and wall outside	15,808 20
66	Road bridge No 72 fencing, locks No 13 and 14 waste weir No 11 grubbing, excavation and embankment and wall outside	11,889 59
67	Farm bridge No 73 and 74 fencing, aqueduct No 6, grubbing, excavation and embankment and wall outside	8,116 87
68	Farm bridge No 75 fencing, grubbing, excavation and embankment and wall outside	1,574 76
69	Farm bridge No 76 fencing, waste weir No 12 grubbing, excavation and embankment and wall outside	1,862 65
70	Fencing, grubbing, excavation, and embankment and wall outside	14,374 80
71	Fencing grubbing excavation and embankment and wall outside	11,259 24
72	Farm bridge No 77 and 78 fencing, locks No 15 and 16, waste weir No 13 grubbing, excavation and embankment	9,174 81
73	Farm bridge No 79 fencing, grubbing, excavation and embankment	3,006 68
74	Fencing, lock No 17, grubbing, excavation and embankment	8,471 89
75	Fencing, grubbing, excavation and embankment	2,257 52
76	Farm and road bridge No 80 and 81 fencing aqueduct No 7 grubbing, excavation and embankment	7,372 80
77	Farm bridge No 82 fencing waste weir No 14 grubbing, excavation and embankment	7,505 88
78	Farm and road bridge No 83 and 84, fencing, grubbing excavation and embankment	4,156 64
79	Fencing, grubbing, excavation, and embankment	993 60
80	Fencing, grubbing, excavation and embankment	2,153 48
81	Farm bridge No 85, fencing, lock No, 18 grubbing, excavation and embankment	6,452 67
82	Fencing, grubbing, excavation and embankment	1,327 68
83	Farm bridge No 86, fencing, grubbing, excavation and embankment	2,245 28
84	Farm bridge No 87, fencing, grubbing, excavation and embankment	2,282 74
85	Farm bridge No 87, a fencing lock No 19 waste weir No 15, grubbing, excavation and embankment	6,431 61
86	Farm bridge No 87 b and 87 c grubbing, excavation and embankment	3,665 10
87	Farm bridge 88 fencing, grubbing, excavation, embankment	3,799
88	Farm and road bridge 89 and 90 fencing, grubbing, excavation	2,011 10

89	farm and road bridge 91 and 92, fencing, excavation	1,851	
90	farm bridge 93 and 94, fencing, culvert No. 16, grubbing, excavation, embankment	3,966	
91	farm bridge 95, fencing waste wier No 16, grubbing, excavation, embankment	2,146	66
92	fencing, grubbing, excavation, embankment	3,304	
93	farm bridge 96, fencing, grubbing, excavation, embankment and protection wall outside,	7,041	50
94	fencing, grubbing, excavation, embankment and protection wall outside	13,640	40
95	farm bridge 97, fencing lock No 20, grubbing, excavation, embankment and protection wall outside	19,995	
96	farm bridge 98, fencing aqueduct No. 8, grubbing, excavation, embankment and protection wall outside	12,744	70
97	farm and road bridge 99 and 100, fencing, grubbing, excavation,	2,310	
98	road bridge 101, fencing, grubbing, excavation,	3,162	50
99	road bridge 102, fencing culvert No 17, waste-wier No 17, grubbing, excavation, embankment and protection wall outside	12,082	10
100	fencing lock No 21, aqueduct No 9, culvert No 18, grubbing excavation, embankment and protection wall outside	17,319	34
101	road bridge 103, fencing, grubbing, excavation, embankment	1,759	65
102	farm and road bridge 104 and 105, fencing, grubbing, excavation	2,004	93
103	fencing, grubbing, excavation, embankment and protection wall outside	3,829	50
104	fencing waste wier No 18, grubbing, excavation, embankment and protection wall outside	11,804	30
105	fencing culvert No 19, grubbing, excavation, embankment and protection wall outside	12,121	50
106	fencing, grubbing, excavation, embankment and protection wall outside	22,047	60
		158,940	78
		$520,564	05

To the Superintendant of the Delaware Division of the Pennsylvania Canal.

SIR—

In compliance with the instructions from the board of canal commissioners, which were communicated by you on the 1st instant, I herewith transmit an estimate at contract prices, of the amount of work remaining to be done, from section 1 to 106, inclusive, extending from Bristol to a point near Godfrey Raub's, and about six miles south of the Lehigh at Easton. In making this esti-

mate, I have included under the head of each section, all the mechanical work that will occur, also the amount of cubic yards of excavation, embankment, rock or hardpan, as nearly as the different items can be determined previous to the execution of the work, which, on a few sections, is not commenced. It is, therefore, probable that the completion of the work may change the amount of different items, but it is confidently believed, that the sum total cannot be materially affected.

H. G. SARGENT,
Engineer.

Canal Office, Delaware Division,
November 20, 1828.

GENERAL RECAPITULATION.

Amount paid for work of sections from 1 to 36 inclusive, see A							$70,275 81		
do	do	do	37 to 49	do	B		24,289 73		
do	do	do	50 to 86	do	C		3,896 60		
								$ 98,462 14	
do	do	on culverts			E		579 08		
do	do	wastewiers			E continued		1,443 02		
do	do	bridges			do	do	573 64		
								2,595 74	
Total amount paid for work done up to 20th November, 1828,									$ 101,057 88
Amount retained till completion on sections see A, B and C							4,722 23		
do	do	do	on culverts see E				90		
do	do	do	on bridges see E continued				137		
Total amount retained							$ 4,949 23		
Amount of work remaining to be done from section 1 to 36 inclusive, see H								78,127 50	
do	do	do	37 to 49	do	do			35,975 17	
do	do	do	50 to 86	do	do			247,520 60	
do	do	do	87 to 106	do	do			158,940 78	
Amount required to complete the work now under contract								520,564 05	
Add the amount already paid as above							101,057 88		
To which add the amount retained as above							4,949 23		
								106,007 11	
Total cost of canal from section 1 to 106 inclusive, at contract prices								626,571 16	

GENERAL RECAPITULATION, *(Concluded.)*

To which add original estimate of the engineer, for the remaining 6 miles—see his report of Aug. 20, 1827, viz:

Cost of sections 1, 2, 3, 4, 5, 6, in that report, estimated for 4 feet water	102,070 81		
Add for the additional cost of 5 feet water	4,000		
Add for lockage and wastewiers on said 6 miles	12,500		
do dam across Lehigh	6,000	124,570 81	
Add 10 per cent.		12,457 08	137,027 89
Total cost of the canal from Bristol to Easton, from the foregoing data			763,599 05
From which deduct the amount paid on work as above			101,057 88
Sum necessary to complete the work			$ 662,541 17

Note.—Damages, houses for the accommodation of lock keepers and current contingent expenses, not having been estimated, are consequently not embraced in the foregoing recapitulation.

Comparison between the original estimate of the Engineer and the actual contract prices.

Total cost of canal from Easton to Bristol, see engineers report of 20th August, 1827,	$ 686,596 77	
To which add for additional cost of locks and road bridges, on the plan adopted, over that on which the original estimate was predicated	64,575	
Add for fencing on the river sections, not included in the original estimate, but included in the amount at contract prices, as a protection either of fencing or wall, to an equal amount, will be necessary in those places,	3,840	
Total cost of canal at contract prices from section 1 to 106 inclusive, and at the original estimate from thence to Easton, see foregoing recapitulation,		755,011 77
		763,599 05
Deficit in original estimate,		$ 8,587 28

Series 6.

DOCUMENTS RELATING TO THE NORTH BRANCH DIVISION.

No. 1.

Report of C. T. Whippo, engineer, on the first location of the North branch line.

To the canal commissioners of the state of Pennsylvania.

GENTLEMEN,

My instructions furnished by Jos. M'Ilwaine, esq. superintendant of surveys, were received on the 24th day of April, from which the following is an extract.

"Your survey and location must necessarily begin at some convenient point for introducing the water of the river into the canal. All accounts agree in representing that the Nanticoke fall about fifty miles above Northumberland, at the foot of the Wyoming valley, affords peculiar advantages for this purpose. At that point, therefore, you will begin your survey, and will continue it downwards on the west side of the river to Northumberland. As soon as you have accomplished a distance of twenty or twenty-five miles from this point, and have fixed its location satisfactorily to yourself, you will make a report on the subject, accompanied by such a draft as will enable the board to understand your plan."

I accordingly commenced at Nanticoke fall, and have run down 27 miles. This distance I have divided into sections of about half a mile each, and these into stations of three chains each. The whole has been located with care, the levels accurately taken, bench marks made, &c. and it is now ready to be put under contract. A few alterations will be necessary in some places which will be made on a revision of the line, and before the work is commenced.

Having made the necessary examinations at the falls, I became satisfied that this was the only point at which we could take a feeder for the supply of the canal below. This must be effected by damming the river.

The dam I propose to make six feet high, that is, six feet above low water mark, and as the depth of the river at this stage is about three feet, the average height of the dam will not vary much from nine feet. By adopting this height we shall not endanger the navigation of the river; the Plymouth flats will not be flowed, and although we shall be obliged to locate the canal within the reach of high floods, and protect a considerable part of it with stone wall, yet this location for the distance upon which we have to encounter this inconvenience, being seven miles and nine tenths will be nearly as favorable to economy, as if we had adopted a higher level. This arises from the fact that on about one half of this distance, the hills are so high and come in so close to the river, that we should be obliged to wall out in any event, and the wall to obtain a permanent foundation, for it would require to be commenced at the same height in both cases and in both cases also its height would be

equal to high floods. The only advantage, therefore, in a higher level, would be in crossing the flats when the cutting would be less. With the level I have adopted it will average about 12 feet.

The wall will require to be about sixteen feet high, on an average for nearly half the distance. This will effectually guard against any common floods, and as stone is very handy and abundant, the work can be done with a moderate expense.

Another advantage is that we can take all the streams in this distance into the canal, and use them as feeders, and save the expense of culverts, aqueducts and embankments. But with all the advantages with which we shall be able to avail ourselves, and with the strictest attention to economy, the expense of this part of the line will still be great. I have not as yet made any estimate not having been so instructed and cannot therefore, determine the amount. This duty I will attend to whenever required.

I have given a descent upon the bottom of the canal of a tenth of a foot in a mile, which will occasion a velocity of current equal to half a mile an hour and give a quantity of water equal to 5928 cubic feet per minute.

This will supply the canal all the way to Northumberland, even with a maximum use of the locks, and supercede the necessity of taking a feeder from the river at any other place.

I herewith transmit maps, profiles and plans of the whole line under consideration.

On the first seven maps there were some errors committed in regard to the profiles, &c. but the following statement will give a correct idea of these sections.

Excavation on map No.		2. 30	*stations*
do.	do.	3–30	do.
do.	do.	4–9	do.
do.	do.	5–27	do.
do.	do.	6–15	do.
		111 stations.	
Wall on map No.		1. 27	*stations*
do.	do.	4–21	do.
do.	do.	5–5	do.
do.	do.	6–15	do.
do.	do.	7–82	do.
		100 stations.	

On map No. 8, we wind off on to the flats, and a profile of the ground is there given. In our progress downward however, we are frequently interrupted by bluffs and hills, which project in, so close to the river, that we shall have to construct the canal along its shore and protect it with stone wall.

One of these places is at Longshore's ferry, and is represented on map No. 9. Another about 70 rods below this, and a third, just before we enter the lands of Nathan Beach. See maps Nos. 10 and 11. These two last places are very difficult. The hills are composed of sand and gravel, and are evidently disposed to slip. Here we shall also be obliged to construct the canal in the river, and fortify it with heavy stone wall. To guard against slipping and washing, the shrubbery should be carefully preserved on the side hill, and more planted where it may be necessary. Below this point, to the upper end of Rocky island, we have smooth even ground, but here a high bluff of slate rock puts in and obliges us to drop down by lock of ten feet, and to locate the canal along the margin of the river.

This difficulty however, continues only twenty-one chains, and then we come on to flats again, upon which we are enabled to make a favourable location all the way to Berwick. This flat though sufficiently wide for the canal is still so narrow as to render it necessary to remove some buildings. Amongst these are some of the out buildings of Mr. Leidy, a shed belonging to Mr. Morris, near the bridge, and a small building attached to Col. Snyder's tannery. None of these are of much value.

Opposite to Berwick we propose to make a lock of eight feet lift. The object of this is to keep the level as low as possible, consistently with the height of the floods, which will greatly lessen the amount and expense of wall, a heavy item at this place, as it extends a mile down, and stone are very difficult to be obtained for its construction. This part of the line is represented on map No. 19. The remaining part of the distance we have fine level ground, and no difficulty except at Brier creek. This must be crossed by culvert and embankment, but as materials for both are very convenient, the expense will not be great. On map No. 24, two buildings must be removed, one a small saw mill and the other a dwelling house, both belong to John Knorr: neither of these buildings are very valuable.

On map No. 24, we have a nine foot lock which enables us to keep on level ground and avoid the side hill.

The number of locks upon this line will be four, viz. One a guard lock at Nanticoke falls, and the others lift locks at the places above mentioned.

The dam at Nanticoke, I propose to build of cribs of hewn timber strongly tied together and filled with stone and gravel.

The locks I would also make of wood, some of the advantages of which I have set forth in my report of last winter, see documents attached to the reports of the canal commissioners to the legislature, page 225. On the plan of the locks I would propose, it requires the same excavation for the lock pit as for a stone lock, and the same expense in laying the foundation. Every part below the top water line of the lower level however, may be considered durable for an indefinite term of time. Indeed, this point I think will be conceded by the advocates of stone locks, for I believe they do not

object to wood for foundations, and on the Erie canal they are nearly all made of wood.

We then come to this result, that the only part of a wooden lock, more perishable than one of stone, the gates in both being equal, is above the top water line of the lower level.

Stone locks have been estimated at one thousand dollars per foot lift, but the expense must be subject to great variation. For instance, locks of small lift sometimes occur. A lock of three feet lift requires the same depth below top water line as one of ten foot lift, and one foot of course above the upper level. If the lock floor be nine inches below the top of the mitre sill with the thickness of the floor three inches to say nothing of the timbers, then the sides must be three times as high as the actual lift, which in one of ten feet lift, this extra work only forms $\frac{6}{10} = \frac{3}{5}$ of the amount instead of two-thirds of it. The same principal applies to wooden locks. The expense will be greater or less, according to the lift, but the average cost exclusive of the pit, and where timber is convenient, I believe will not vary much from $ 150 or at most $ 200 per foot lift. Here I suppose it can be procured cheap, particularly pine, which is considered equally as good as oak, and is commonly preferred on account of its being lighter and more easily worked.

A serious difficulty with the locks on the New York canals, has been occasioned by the use of bad lime. One advantage of wooden locks is, that they need none; another is that they can be repaired in winter when the canal is not navigated. The true principle in works of this kind, is to effect our object with the least possible expense. This I think we shall do with the use of wooden locks for while they last, there can be no doubt but they will answer equally as well as those of stone. The only question will be in regard to their durability. Upon this score there can be no doubt; but I am fully satisfied that the interest on the difference of expense will greatly exceed the expense of repairs.

In my report of last winter, I allowed that wooden locks would last only ten years, and that an expense at that time equal to their original cost would be required to put them in repair. This was evidently placing them upon too unfavourable a footing, for I am satisfied from the best information I can get, that even the upper timbers will last sixteen years, and some say twenty. But allowing them to last only sixteen years, and the difference of expense to be $ 7000 upon a ten feet lock, then at the time they require repairing, it will be seen that this sum at 6 per cent. per annum, simple interest, will amount to $ 13,720. If from this we deduct $ 1,720, which I think will pay for all the intermediate repairs, and put them in as good condition as at first, then we shall have a saving of $ 12,000, which being put at interest at the same rate for the next succeeding sixteen years, will amount to $ 23,520. Deduct $ 1,720 for repairs again, and we have a clear saving of

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TABLE A.

REPORT of the Superintendent of the North Branch division of the Pennsylvania Canal to the board of Canal Commissioners of Pennsylvania.

In compliance with the instructions received of the Secretary of the board of Canal Commissioners, the superintendent on the North Branch division of the Pennsylvania Canal makes the following report, relating in the contracts entered into for the execution of the work on the said division, viz:—After giving due and legal notice of the intended letting of the work, and examining the numerous proposals that had been received up to the 24th of July last agreeably to public notice, the said Superintendent made the allotment, and entered into contracts for the excavation and construction of about 27 miles of the said division, commencing at a point near the Nanticoke Falls, and extending down the west side of the North Branch of the Susquehanna, to the termination of the 73d section, about miles thereof, commencing at Nanticoke, being divided into quarter-mile sections, and the remainder into sections of about a half mile each. The names of the contractors, the dates of the contracts, and the prices at which the work was let, appear in the following table, viz.

No. of sections	Names of Contractors.	Date of Contracts	Excavation per cubic yard. Common rock.	Solid rock.	Slate rock.	Detached rock.	Hard pan	Embankment.	Puddling.	per perch. Vertical wall.	Slope wall outside	Square yd. Slope wall inside.	per foot running Square timber.	Round timber.
			cts.	cts.	cts.	cents.	cts.	cts.	cts.	cts.	cents.	cents	cents	cents.
2	Jacob B. Barse & James Midler.	July 26, 1828	8	50	37½	52	16	12½	15	55	37½	36		
3	J. Patterson, T. J. Petriken, H. F. Tamany, John K. Boyer and M'Laughlin,	July 28,	10	50	25		17	14	15	50	62½	20		
4	Henry Cady, Calvin Comstock and Alexander Dickson,	same	10	55	33	40	21	12	14	50	45	23		
5	Frederick Pratt,	same	10	53	35	38	15	13	13	40	40	37		
6	Henry J. Fritcher.	same	9											
7	Peter Barger, jr. Warren Mack, jr. & Frederick Billinger,	same	11	60	20	25	31	11	20	44	38	12		
8	Frederick Pratt and James D. Trout,	Sept 19,	9											
9	Robert M'Reynolds and Peter F. Mudy,	Aug 8,	11½	49	59	35	22	13½	20	69	59	49 per p.		
10	Jacob Drumheller and William W. Gift,	July 29,	10	62½	62½	60		10½	12½	100	87½	37½		
11	Phineas Tuttle, Timothy N. Ferrell and Daniel Carmichael	July 28,	11	E. E.			25	6	E. E.					
12	Robert M'Reynolds and Peter F. Mudy,	Aug 8,	11½	49	59	34	22	13	20	69	59	49 per p.		
13	E. S. Dodd, P. Dodd, L. Dodd, B. Hale and B. R. Drake,	Aug 6.	10½	43	15	37	15½	10½	12½	45	45	13		
14	Same,	same	10	44	15	37	15½	10½	12½	45	45	13		
15	Patterson, Petrikin, Taminy, Boyer and M'Laughlin,	July 28,	8½	40	25		15	17	18	48	45	20		
16	Andrew Y. Moore, Edward S. Moore and John Dean,	Aug 6,	10	56	34	39	20	15	25	60	70	17		
17	William Pratt,	July 26,		60	35	50	16	13	17	50	40	35		
18	James D. Gallup, John R. Dean, and Samuel Thomas,	Aug 8,	10	50	30	18	16	18	18	100	75	72	per p.	
19	William Pratt,	July 26,	10	50	54	50	16				59	34		
20	Austin Day,	same	12½	75	100	87½	50	14	37½	75	75	15		
21	Allotted to Samuel Thomas at re-letting, articles not yet signed,													
22	Charles Cook, Hiram Cook and E. W. Cook,	July 28,	9	60	30	40	25	9						
23	Same,	same	9	60	30	40	25	9						
24	S. W. & T. Shields and William Emery,	Aug 5,	10½	40	32	56	20	11	18			62½	per p.	
25	Charles Cook, Hiram Cook and Elbert W. Cook,	July 28,	10	60	30	40	25	12	16	50	43	45		
26	Frederick Pratt,	same	12	50	30	40	15	12½	17	62	62	40		
27	William Forsyth, William Wilson and William Jones,	Aug 8,	10	50	30	25	16	12½	20	75	75	30	per p.	
28	Hugh Stewart,	July 28,	8	55	20	50	20	15	20	50	40	40	per p.	
29	Same,	same	8	55	25	50	18	13	20	50	40			
30	James Moorhead, Alexander Beard and John Koons,	Aug 4,	9	50	30	50	37½	15		60	60			
31	Same.	same	12½	40		50		14	18	70	70			
32	John Flanagan and Nicholas Egan,	July 28,	8	70	33	50	25							
33	Same,	same	8	70	33	50	24							
34	Lyman H. Philips and Thomas Plews,	same	10	100	00	58	30	12		200		62½	per p.	
35	Samuel Everitt,	same	10	50	35	50	25	11	18	75	75	16		
36	Same,	same	9	50	35	50	25	12½	18	50	75	16		
37	Same,	same	9	50	35	50	25	12	18	50	50	16		
38	Thomas Moore, Patrick Moore and James Moore,	same	10	46	30	21	23	11	16	38	38	22		
39	Same,	same	9	43	25	30	25	14	15	52	56	23		
40	Phineas Tuttle, Timothy N. Ferrell and Daniel Carmichael,	same	9	75	75	50	25	9	18	65		22		
41	Rodman, Reynolds and Co.	same	9	50	35		18	11	15	50	50	20		
42	Thomas, Patrick and James Moore,	same	9	40	24	28	18	12	16	80	85	23		
43	Nathan Beach and Samuel Everitt	same	11	45	25	25	30	12	18	E. E.				
44	Same	same	11	40	35	25	25	11½	12	E. E.				
45	Alexander Jameson, Esq.	Sept 26,	9	50	25	18½	16	12	18	E. E.				
46	Thomas M. Scott	July 29,	8	60	35	60	14	14						
47	Jesse Hicks	Aug 15,	11	40	40	25	20	11	20					
48	John L. Bevins & James Cummings, and assigned by Bevins to Cummings (since deceased)	July 28, same day	10	60				10						
48	Re-let to John Ferrell and Patrick Kelly	Oct 15.	10	60	30	37½	30	11	18					
49	Michael Cain and Patrick Brennen	July 28,	7	50	25	26	18	9	18		31			
50	Michael F. Simons and Hugh Crolly	July 29,	9½	50	35	E. E.	25	10	E. E.					
51	Robert Reston	July 28,	8	42	22	45	18	9	18	50	60	17		
52	James Steadman, L. Hodge & and John J. Kelcey	Aug 14,	10	50	23	17	14	14	E. E.				8½	4
53	Patterson, Petrikin, Tamany, Boyer and M'Laughlin	July 28,	11	45	25		18	15	20	100	90	12		
54	Elijah Russell		10					13						
55	Jacob B. Barse and James Medler	July 28,	10	40	37½	16	25	12	25	75	50	50	per p.	
56	Jeremiah Blanchard Jr. and Daid Holden	July 26,	8	50	25	25	1½	10	10	65	65	60	do	
57	Charles Stanton and Thomas Arnold	Aug 8,	8	75	50	25	25	10	20	150	62½			
58	Lyman H. Philips and Thomas Plews	Sept 8,	8	50	45	50	18	11	25					
59	Same	July 28,	10			40	25	12½				23	7½	5
60	Same	same	10			40	25	12½				50	7½	5
61	Calvin Holman	same	10			40	25	12½				50	7½	5
62	James Wheelahan	Aug 20,	7	60	30	37½	22	14	20	100	100	100		
63	Michael O'Brian	July 28,	7	50	25		22	13	15	40	62½	18		
64	John and Jesse Bowman	July 29,	9	50	25	15	25	15				15		
65	Leonard H. Spoonenburg and Henry Charles	July 30,	10½	45	30	30	26	11	16					
66	Hiram Cook and Elbert W. Cook	Aug 2,	9	40	25	37½	17	14	20	75	75	18		
67	John Bowman	July 28,	10	60	30	40	25	12						
68	John Thompson	July 29,	10	56	20	14	15	12	14	15	27	20		
69	Anthony Groves and James Fox	Oct 3,	9	64	38	64	20	15	18	100	140			
70	Peter Barg and Warren Mack, Jr	July 28,	10	40	28	24	16	16	18	25	50	37		
71	Uzal Hopkins, Esq	same	10	58	50	30	24	10	16	44	40	12		
72	Daniel Spoonenberg and Henry Charles	July 28,	10	50	40		20	9						
73	Jacob Custenbader	Aug 2,	10	50	37	45	18	14	15	75	75	17		
		Sept 10,	11½	40	20	30	25	10	12					

*For filling in the dam per cubic yard 20 cents, and for the tow-path 84 per rod.

All grubbing and clearing at the estimate of the Engineer.

THE Superintendent of the North Branch Division of the Pennsylvania Canal, would further report—That after legal notice having been given, thirty five sections of that part of the said Division which lies between the 73d section and the forks of the river at Northumberland, making about 18 miles, were allotted for construction, immediately after the 22d of October last, and also section No. 1, in connexion with the dam and guard lock at Nanticoke falls. The construction of the greater part of these sections has been actually contracted for, at the prices exhibited in the following table; and it is confidently expected that the remainder will be taken, by the persons to whom they were allotted.

No of Section	Names of Contractors.	Date of Contracts.	Excavation per cubic yard. Grubbing & clearing whole Sec.	Common	Solid rock.	Slate rock.	Detached rock.	Hard pan.	Per cubic yard. Embankment.	Puddling.	Per perch. Slope Vertical wall on wall.	Slope wall on inside	Sq. yd. Slope wall on inside.
			Dollars.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.	Cents.
1	Brown, Truescott, Bell, Dean, Reed and Co.		Est. Eng.	10	64	30	40	18	11	E. E.	56	60	28
80	Shermon Dibble and Olray Adams,	Oct 27, 1828	45	8½	75	31	25	25	10	Est Eng			
81	Same,	same	37	8½	75	31	25	25	12	Est Eng			
82	Michael M'Cormick,	Nov 18,	450	8½	58	20	25	18	12	13	18	16	18
83	Elijah Russel and E. O. Jackson,	Oct 27,	208	9	40	31	37	25	11	15	50	30	50
83	Shermon, Dibble and Adams,	same	40	8	62½	25	21	21	10	E E			
86	Robert Reston,	Nov 7,	100	9	40	25	45	17	12½	20	40	39	18
87	Henry Stetler,	Nov 3,	85	8	40	22	20	14	11	30	60	60	30
88	William W. Gift and James Cavell,	Oct 28,	125	8½	37½	22	29½	20	10	14½	49½	48	18
89	George H. Willits,	Nov 6,	125	8	74	35	40	14	15	E E	65	62	23
90	James Middler and Anson Southerland,	same	25	8									
94	Same,	same	45	9	50		50		12				
95	Joseph Peacock and Samuel Everitt,	Oct 27,	180	7½	50	50	25	15	11	E E	50	75	20
99	Same,	same	200	7½	50	48	25	14	10½	E E	50	75	28
100	Jeremiah Blanchard and David Holden,	Nov 8,	45	8	43	50	25	20	10	25	125	75	50
101	John Houston,	Oct 27,	80	9	75	75	10	21	12	E E			
102	Samuel Carnahan,	Nov 3,	50	9					10				
103	John Morrow and Patrick Braly,	Nov 28,	Est. Eng.	7	87½	20	28	12½	11½	12½	37½	37½	37½
104	Joseph Mouse,	Oct 31,	346	9	E. E.	E. E.	20	E. E.	12½	Est eng			
105	William Donaldson and Alexander Montgomery,	Nov 4,	59	8	44	18	28	12	10	12	48	42	18
106	Same,	same	20	7	43	29	19	11	10	13	49	43	19
107	Same,	same	120	8	46	18	28	14	10	14	75	68	20
108	Hiel Brockway,	Oct 27,	99	8			25	50	12				
109	Same,	same	50	8			25	25	12	Est Eng			18
110	D. Petrikin, A. Y. Moore and E. S. Moore,	same	28	8	50	48	26	15	11	E E	47	56	25
111	William Colt,	Nov 12,	100	7	40	22	27	12	10	12½	45	40	18
121	Michael Nowlin,	Nov 8,	512	8½	50	20	20	20	11	20	50	40	18
122	Daniel and Roswell Cande,	Oct 31,	326	9	63½	14		12					
123	Hugh Crawley and Andrew M'Laughlin,	Nov 1,	514	9	53	36	28	24	11				
124	Joseph Nourse and Peter Pursell,	Nov 4,	342	9½	40	20	40	20	12½	18½			20
125	Same,	same	45	9½	40	20	40	20	12½	18½			20
126	James and William Wilson and Forsyth and Co.	Nov 3,	50	9	60	50	40	23	14	18	100	100	55
127	Aaron C. Hoar and Adam Van Patten,	Oct 28,	25	7½	48	38	35	18	11				
128	James Lee and Francis Fagan,	Nov 3,	20	8					18	15	20		13½
84	Allotted to Flood and Creelman, contract not signed,		72	8½	50	25	40	20	9½				
99	Same, do do		55	8	60	25	55	23	9	16			

THE dam across the North Branch of the Susquehanna, at Nanticoke falls, was allotted for construction, at the same time, to Brown, Trescott, Bell, Dean, Reed & Co. at the following prices, viz:

For making the abutments and all other walling connected with the dam, in range work, including materials, per perch of 25 cubic feet, $1 96. All other walling connected with the dam, in common rubble work, per perch, of 25 cubic feet, 98 cents. For filling in the dam with stone, per cubic yard, 30 cents. For all necessary timber, per foot, running measure, 5½ cents. For gravelling or puddling, per cubic yard, 35 cents. Iron, if used, per lb. 10 cents.

At the same time the guard-lock, was allotted to the same company, (being 18 feet high,) at the rate of $128 73 per foot in height, exclusive of paddle gates. Iron work at 10 cents per lb. All other work necessarily occurring, at the estimate of the engineer.

At the same aime, all the locks, aqueducts and culverts, were allotted for construction, to the following persons, and at the following prices, viz:

THE LOCKS.

No of locks	Contractors' names.	Height of locks.	Prices per foot lift.
1	Nathan Beach and Thomas Everitt.	11.6 feet lift.	$150 00
2	William M'Kelvy,	8 do	149 75
3	Same.	5 do	149 75
4	Same.	10 do	149 75
5	Same.	10 do	149 75
6	Same.	10 do	149 75
7	Same.	10 do	149 75
8	Same.	7 do	149 75
9	Same.	7 do	149 75

Exclusive of paddle gates, which are estimated at $160 for each lock.

AQUEDUCTS.

Over Briar creek, John and Jesse Bowman, 64 ft. in length, at $2 15 per perch, stone work—superstructure, or trunk			$6 00 per ft. lineal—iron, 10 cts. per lb.	
Fishing creek, Davis Cleaver,	182	1 50	10 00, including iron.	
Mahoning H. & W. Colt & Davis,	60	1 00	6 31	10
Ledge's run, Jno. Moore, Jno. Walls & Co	50 feet,	2 50	7 50	

CULVERTS.

On section No. 51, by John Moore, John Walls and M'Cleery, at $2 50 per perch, masonwork—No. 94, by Samuel Krawl, at $2 50 per perch, masonwork.

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and Jesse Bown
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& W. Colt & D
p. Moore, Jno. V

John Moore, Jo

21,800 for thirty-two years. But this is for one lock. Let us apply it to all the locks which may be made on the North Branch (say 34) and we have $741,200 saving, for the same term of time, a sum not only equal to the repairs of locks, but a large portion of the canal also.

Since writing the above, I have made a second examination of the ground at Rocky island, and believe that the cheapest method of making a canal along the rocky and precipitous banks at that place will be to throw a dam sufficiently high and wide for a towing path across to the head of the island—extend the towing path along the island to its lower end, and then by dam again cross over to the main land. This will save walling 21 chains, and will give us the advantage of a broad, deep canal, which is an important object, and should always be obtained whenever it can be without increasing the expense.

Respectfully submitted,

CHARLES T. WHIPPO,

Berwick, May 30, 1828.

No. 3.

An estimate of the cost of the North Branch Division of the Pennsylvania canal, from Nanticoke falls to section No. 73, inclusive, with the other works connected therewith; including also the dam to be constructed across the river near the said falls.

Beginning with the dam.

(At contract prices.)

100,000 feet of lineal timber at 5¼ cts. per foot,	$5,250	
7,800 cubic yards of stone to fill dam and chute 30 cts.	2,340	
5,000 gravel or puddle for dam at 35 cts.	1,750	
168 perches of mason work for abutment at $1 96,	329	
Clearing the bottom of the river for foundation and chute,	500	
Puddling, sheet piling, filling in with brush, &c.	250	
		10,419
Locks.		
Guard lock at Nanticoke 18 feet high at 128 73 per foot in height,		2,317 14
Lock No. 1, of 11.6 feet lift at 150 per foot lift,	1,740	
Paddle gates,	160	
		1,900 00

Lock No. 2, of 8 feet lift at 14 75 per foot lift,	1,198	
Paddle gates,	160	
		1,358 00
Lock No. 3, of 9 feet lift at 149 75 per foot,	1,347 75	
Paddle gates,	160	
		1,507 75

Aqueduct over Briar creek.

On section No. 64, 70 feet in length at 6 00,	420	
400 perches of mason work at 2 15 per per.	860	
		1,280

Not contracted for.	Culvert on section No. 43, estimated at	212
	do. on section No. 45,	50
	do. on section No. 46,	100
Culvert on section No. 51, 100 perches of mason work at 2 50 per perch,		250
do. on section No. 54, 100 perches at 2 50,		250
Not under contract.	Culvert on section 65, estimated at	50
	Culvert section 72, at	50
	do. do. 73, at	50
	21 farm bridges at $200 each	4,200
	3 road bridges, at 250 each	750

EXCAVATION AND CONSTRUCTION OF CANAL.

Section No. 1.

Vertical wall	5220 perches at 56½cts.		2,923 26	
Excavation	13,570 yards	10	1,357	
				4,280 26

Section No. 2.

Vertical wall	6,090 perches at 55 cts.		3,349 50	
Excavation	21,316 yards	8	1,705 28	
Embankment	6,080	12½	760	
Grubbing and clearing			96	
				5,906 78

Section No. 3.

Vertical wall	5,762 perches at 50 cts.		2,881	
Excavation, common	18,165 yards	10	1,816 50	
Detached rock	2,819	45	1,268	
Grubbing and clearing			84	
				6,050 03

Section No. 4.

Vertical wall	6,022 perches at 50 cts.	3,011	
Excavation	17,151 yards at 10	1,713 10	
Detached rock	2,008 40	803 20	
Grubbing and clearing		100	
			5,637 30

Section No. 5.

Vertical wall	1,305 perches at 40 cts.	522	
Embankment	1,722 yards 13	223 86	
Excavation	34,815 10	3,481 50	
Grubbing and clearing		50	
			4,277 36

Section No. 6.

Excavation	41,832 yards at 8 cts.	3,346 56	
Grubbing and clearing		42	
			3,388 56

Section No. 7.

Excavation	57,771 yards at 11 cts.	6,354 81	
Grubbing and clearing		25	
			6,379 81

Section No. 8.

Excavation	33,130 yards at 9½ cts	3,147 35	
Grubbing and clearing		25	
			3,172 35

Section No. 9.

Excavation	40,026 yards at 11½ cts	4,603	
Grubbing and clearing		96	
			4,699

Section No. 10.

Excavation	58,737 yards at 10 cts	5,873 70	
Grubbing and clearing		96	
			5,969 70

Section No. 11.

Excavation	44,100 yards at 11 cts	4,851	
Waste weir		500	
Grubbing and clearing		100	
			5,451

Section No. 12.

Excavation	50,253 yards at 12½ cts	6,281 62	
Grbbing and clearing		90	
			6,371 62

Section No 13

Excavation	36,596 yards at 10½ cts	3842 68	
Grubbing and clearing		20	
			3,862 68

Section No 14

Excavation	19,572 yards at 10 cts	1,957	20	
Outer slope wall	204 perches 45	91	80	
Grubbing and clearing		20		
				2,069

Section No 15

Outer slope wall	4,296 perches at 45 cts	1,933	20	
Excavation	16,562 yards 8¾	1,449	17	
Detached rock	429 perches 50	214	50	
Slate rock	300 40	120		
Grubbing and clearing		100		
				3,816 87

Section No 16

Outer slope wall	3,972 perches at 70 cts	2,780	40	
Excavation	16,520 yards 10	1,552		
Detached rock	429 39	167	31	
Slate rock	300 56	168		
Grubbing and clearing		100		
				4,867 71

Section No 17

Outer slope wall	3,310 perches at 40 cts	1,324		
Excavation	23,304 yards 12½	2,913		
Hard pan	504 16	80	64	
Solid rock	300 60	180		
Detached rock	385 50	191	50	
Grubbing and clearing		94		
				4,788 14

Section No 18

Excavation	68,439 yards at 10 cts	6,843	90	
Grubbing and clearing		25		
				6,868 90

Section No 19

Vertical wall	1,340 perches at 75 cts	905		
Excavation	57,322 yards 10	5,732	20	
Detached rock	346 50	173		
Grubbing and clearing		25		
				6,835 20

Section No 20

Excavation	21,807 yards at 12 cts	2616	84	
Vertical wall	6,090 perches 75	4,567	50	
Detached rock	728 yards 37½	273		
Hard pan	757 50	378	50	
Grubbing and clearing		210		
				8,045 84

Section No. 21.

Excavation	27738 yards at 9 cts	2,496	42	
Grubbing and clearing		15		
				2,511 42

Section No 22

Excavation	25,632 yards at 9 cts	2,306	88	
Outer slope wall	204 perches 90	183	60	
Grubbing and clearing		100		
				2,590 48

Section No 23

Outer slope wall	1,836 perches at 90 cts	1,652	40	
Excavation	20,978 yards 9	1,888	02	
Grubbing and clearing		100		
				3,640 42

Section No. 24.

Excavation	20,895 yards at 10½ cts	2,193	97	
Grubbing and clearing		100		
				2,293 97

Section No 25

Excavation	33,198 yards at 10½ cts	3,479	49	
Grubbing and clearing		25		
				3,504 49

Section No 26

Outer slope wall	4,122 perches at 62 cts	915	64	
Excavation	17,560 yards 12	2,107	20	
Hard pan	942 15	141	30	
Detached rock	319 40	127	60	
Slate rock	150 50	75		
Grubbing and clearing		242		
				3,608 74

Section No 27

Outer slope wall	3,722 perches at 75 cts	2,791	50	
Excavation	17,560 yards 10	1,756		
Hard pan	712 16	113	92	
Detached rock	320 25	80		
Grubbing and clearing		242		
				4,983 42

Section No 28

Outer slope wall	3,810 perches at 40 cts	1,524		
Excavation	15,540 yards 8	1,243	20	
Hard pan	628 20	125	60	
Detached rock	712 50	356		
Grubbing and clearing		242		
				3,490 80

Section No. 29.

Outer slope wall	3,766 perches at 40 cts	1,506	40	
Excavation	16,120 yards 8	1,289	60	
Hard pan	692 18	124	56	
Detached rock	575 50	287	50	
Grubbing and clearing		231		
				3,439 06

Section No. 30.

Outer slope wall	5,612 perches at	60 cts	3,367 20	
Excavation	17,560 yards	9	1,580 40	
Hard pan	1'0	37	37	
Solid rock	1,220	50	610	
Detached rock	1,342	30	402 60	
Grubbing and clearing			200	
				6,197 20

Section No. 31.

Excavation	30,853 yards at	12½ cts	3,856 62	
Hard pan	4,170	25	1,042 50	
Detached rock	325	30	97 50	
Inner slope wall	462 sq. yards	17	78 54	
Grubbing and clearing			50	
				5,125 14

Section No. 32.

Excavation	29,862 yards at	8½ cts	2,538 28	
Hard pan	927	23	213 21	
Detached rock	195	50	97 50	
Grubbing and clearing			15	
				2,828 99

Section No. 33.

Excavation	19,173 yards at	8 cts	1,533 84	
Grubbing and clearing			15	
				1,548 84

Section No. 34.

Excavation	10,374	at 10 cts	1,037 40	
Waste weir			500	
Grubbing and clearing			84	
				1,621 40

Section No 35.

Excavation	9,093 yards	at 10 cts	909 30	
Grubbing and clearing			35	
				944 30

Section No. 36.

Excavation	7,938 yards	at 9 cts	714 42	
Vertical wall	6,090 perches	75	4,567 50	
Solid rock	1,200 yards	50	600	
Detached rock	1,120	30	336	
Grubbing and clearing			150	
				6,367 92

Section No. 37.

Excavation	6,340 yards at	9 cents	570 60	
Vertical wall	5,880 perches	50	2,940 00	
Solid rock	150 yards	30	45 00	
Grubbing and clearing			130 00	
				3,685 60

Section No. 38.

Outer slope wall	615 perches at 38 cents	233 70		
Excavation	19684 yards 9	1,771 56		
Grubbing and clearing		175 00		
			2,180	26

Section No. 39.

Outer slope wall	4,310 perches at 56 cents	2,413 60		
Excavation	17,684 yards 9	1,591 56		
Grubbing and clearing		175 00		
			4,180	16

Section No. 40.

Excavation	13,038 yards at 9 cents	1,173 42		
Outer slope wall	570 perches 68	387 60		
Grubbing and clearing		30 00		
			1,591	02

Section No. 41.

Excavation	13,414 yards at 9 cents	1,207 26		
Grubbing and clearing		75 00		
			1,282	26

Section No. 42.

Outer slope wall	4,310 perches at 85 cts	3,663 50		
Excavation	17,684 yards 9	1,591 56		
Grubbing and clearing		160		
			5,415	06

Section No. 43.

Outer slope wall	760 perches at 85 cts	646		
Excavation	22,732 yards 11	2,500 52		
Grubbing and clearing		100		
			3,246	52

Section No. 44.

Excavation	14,306 yards at 11 cts	1,573 66		
Grubbing and clearing		35		
			1,608	66

Section No. 45.

Excavation	4,511 yards at 9 cents	405 99		
Embankment	14,696 12	1,763 52		
Grubbing and clearing		15		
			2,184	51

Section No. 46.

Excavation	6,303 yards at 8 cents	504 25		
Embankment	6,200 14	868		
Grubbing and clearing		150	1,522	25

Section No. 47.

Excavation	16,044 yards at 11 cents	1,764 84		
Grubbing and clearing		225		
			1,989	84

Section No. 48.

Excavation	12,835 yards at 10 cents	1,283 50		
Hard pan	824 25	206		
Detached rock	640 50	320		
Grubbing and clearing		225 00		
			2,034	50

Section No 49.

Excavation	11,620 yards at	7 cents	813 40		
Hard pan	565	at 18	101 70		
Grubbing and clearing			15 00		
					930 10

Section No. 50.

Excavation	11,620 yards at	9½ cents	1,105 90		
Hard pan	580	at 25	145 00		
Grubbing and clearing			50 00		
					1,298 90

Section No. 51.

Excavation	13,073 yards at	8½ cents	1,111 20		
Embankment	1,621	at 9	145 89		
Hard pan	2,358	at 18	424 44		
Grubbing and clearing			75 00		
					1,756 53

Section No. 52.

Excavation	14,481 yards at	10 cents	1,448 10		
Embankment	1,100	at 14	154 00		
Hard pan	810	at 25	202 50		
Slate rock	210	at 25	52 50		
Detached rock	150	at 17	25 50		
Outer slope wall	1,200 perches at	60	720 00		
Grubbing and clearing			55 00		
					2,657 60

Section No. 53.

Outer slope wall	1,600 perch. at	90 cents	1,440 00		
Excavation	17,012 yards at	11	1,871 32		
Embankment	6,840	at 13	889 20		
Hard pan	1,142	at 18	205 56		
Detached rock	310	at 38	117 80		
Grubbing and clearing			60 00		
					4,583 88

Section No. 54.

Excavation	11,846 yards at	10 cents	1,184 60		
Hard pan	1,300	at 25	325 00		
Slate rock	1,642	at 37½	615 75		
Detached rock	150	at 16	24 00		
Grubbing and clearing			174 00		
					2,323 35

Section No. 55.

Excavation	23,712 yards at	8 cents	1,896 96		
Hard pan	610	at 12½	76 25		
Detached rock	720	at 25	180 00		
Outer slope wall	4,100 perch. at	65	2,665 00		
Grubbing and clearing			320 00		
					5,138 21

Section No. 56.

Excavation	12,856 yards at	8 cents	1,068 48	
Hard pan	3,700	at 25	925 00	
Detached rock	1,522	at 25	380 50	
Outer slope wall	2,120 p'rch. at	62½	1,325 00	
Grubbing and clearing			180 00	
				3,878 98

Section No. 57.

Excavation	3,400 yards at	8 cents	912 00	
Hard pan	850	at 18	153 00	
Detached rock	150	at 50	75 00	
Grubbing and clearing			84 00	
				1,224 00

Section No. 58.

Excavation	3,400 yards at	10 cents	340 00	
Embankment	21,120	at 12½	2,640 00	
Square timber	28,512 ft. lineal at	7½	2,138 40	
Round timber	25,640	at 5	1,282 00	
Grubbing and clearing			90 00	
				6,490 40

Section No. 59.

Embankment	28,950 yards at	12½ cents	3,618 75	
Square timber	35,640 ft. lineal at	7½	2,653 00	
Round timber	44,560	at 5	2,228 00	
Grubbing and clearing			250 00	
				8,749 75

Section No. 60.

Embankment	28,950 yards at	12½ cents	3,618 75	
Square timber	35,640 ft. lineal at	7½	2,653 00	
Round timber	44,560	at 5	2,228 00	
Grubbing and clearing			250	
				8,749 75

Section No. 61.

Excavation	7,968 yards at	7 cents	557 76	
Grubbing and clearing			45 00	
				602 76

Section No. 62.

Excavation	13,944 yards at	9 cents	1,254 96	
Grubbing and clearing			90 00	
				1,344 96

Section No. 63.

Excavation	13,900 yards at	9 cents	1,251 00	
Grubbing and clering			42 00	
				1,293 00

Section No. 64.

Embankment	12,355 yards	at	11 cents	1,359 05	
Excavation	19,265	at	11 ¼	2,022 88	
Hard pan	2,100	at	26	546 00	
Detached rock	580	at	30	174 00	
Grubbing and clearing				30 00	
					4,131 93

Section No. 65.

Embankment	5,33 yards	at	14 cents	746 76	
Excavation	6,322	at	9	568 98	
Hard pan	276	at	17	46 92	
Detached rock	60	at	37½	22 50	
Grubbing and clearing				45 00	
					143 16

Section No 66

Excavation	12,418 yards	at	10 cts.	1,241 80	
Hard pan	750	at	25	187 50	
Detached rock	80	at	40	32 00	
Grubbing and clearing				225 00	
					1686 30

Section No. 67.

Excavation	5,492 yards	at	10 cts.	549 20	
Slate rock	2 00	at	20	460 00	
Embankment	520	at	12	62 40	
Grubbing and clearing				35 00	
					1106 60

Section No. 68.

Excavation	12,835 yards	at	9¾ cts.	1,251 41	
Slate rock	1,120	at	38	425 60	
Grubbing and clearing				225 00	
					1902 01

Section No. 69.

Excavation	11,940 yards	at	10 cts.	1,194 00	
Detached rock	330	at	28 cts.	92 40	
Grubbing and clearing				333 00	
					1619 40

Section No. 70.

Excavation	20,820 yards	at	10 cts.	2,082 00	
Hard pan	322	at	24	77 28	
Grubbing and clearing				255 00	
					2414 28

Section No. 71.

Excavation	10,960 yards	at	10 cts.	1,096 00	
Hard pan	330	at	15	49 50	
Grubbing and clearing				45 00	
					1190 50

Section No. 72.

Excavation	7,254 yards	at	10 cts.	725 40	
Embankment	3,164	at	14	442 96	
Hard pan	1,994	at	18	358 92	
Grubbing and clearing				55 00	
					1582 28

Section No. 73.

Excavation	8 300 yards	at	11¾ cts.	975 25	
Embankment	1,742	at	10	174 20	
Hard pan	920	at	25	230 00	
Grubbing and clearing				378 00	
					1757 45
Total					$ 283,007 33

No. 4.

Estimate of the cost of completing the remainder of the North branch Division to Northumberland.

An estimate exhibiting the amount of work necessary to complete that part of the North branch Division, Pennsylvania canal, which lies between the 73d section and its termination at Northumberland. Also the prices at which a part of it has been let for construction.

Sec. No. 80, contains	Excavation 8,070 at 8½ cts.			$685 95
	Embankment 2,600 at 10			260 00
	Grubbing $45,			45 00
				990 95
Sec. No. 81, do.	Excavation 8,160 at 8½			
	Embankment 10,742 at 12			
	Grubbing $87		—	1,869 64
Sec. No 82, do.	Excavation 8,680 at 8¾			
	Embankment 1,687 at 12			
	Grubbing $350		—	1,281 19
Sec. No. 83, do.	Excavation 11,382 at 9			
	Embankment 520 at 11			
	Grubbing $300		—	1,381 58
Sec. No. 84, do	Excavation 12,220 at 8½			
	Embankment 3,460 at 9¼			
	Grubbing $72		—	1,439 40
Sec. No. 85, do	Excavation 7,382 at 8			
	Embankment 9,734 at 10			
	Grubbing $40		—	1,604 06
Sec. No. 86, do	Excavation 8,745 at 9			
	Embankment 5,840 at 12½			
	Grubbing $100		—	1,617 05

Sec. No. 87,	contains	Excavation	3,460	at	8	
		Embankment	1,990	at	11	
		Grubbing		$85	—	580 70
Sec. No. 88,	do	Excavation	500	at	8½	
		Embankment	20,380	at	10—	2,080 90
Sec. No. 88,	do	Puddling	4,720	at	14½	
		Vertical wall	4,725	at	49¾	
		Grubbing		$125	—	3,160 48
Sec. No. 89,	do	Excavation	3,570	at	8	
		Embankment	20,840	at	15	
		Puddling	4, 00	at	20	
		Solid rock	100	at	74	
		Vertical wall	4,475	at	63	
		Grubbing		$125	—	7,349 85
Sec. No. 90,	do.	Excavation	13,948	at	8	
		Embankment				
		Grubbing		$20	—	1,135 84
Sec. No. 94,	do	Excavation	10,520	at	9	
		Embankment	2,806	at	12	
		Grubbing		$45	—	1,328 52
Sec. No. 95,	do	Excavation	4,400	at	7¾	
		Embankment	20,080	at	11	
		Puddling	4,475	at	18	
		Vertical wall	5,903	at	50	
		Grubbing		$180	—	5,566 80
Sec. No. 96,	do	Excavation	5,700	at	7¾	
		Embankment	28,320	at	10¾	
		Puddling	6,600	at	18	
		Solid rock	480	at	50	
		Vertical wall	8,259	at	50	
		Grubbing		$200	—	9,236 15
Sec. No. 99,	do	Excavation	9,800	at	8	
		Embankment	1,774	at	9	
		Grubbing		$55	—	998 66
Sec. No. 100,	do	Excavation	8,260	at	8	
		Embankment	3,700	at	10	
		Grubbing		$45	—	1,075 80
Sec. No. 101,	do	Excavation	8,230	at	9	
		Embankment	8,450	at	12	
		Puddling	1,200	at	16	
		wall	3,265	at	70	
		Grubbing		$80	00—	2,852 20
Sec. No. 102,	do.	Excavation	8,500	at	9	
		Embankment	1,478	at	10	
		Grubbing		$80	00—	942,80

Sec. No. 103, contains	Excavation	9,340	at	7	
	Embankment	4,470	at	11½	
	Grubbing			—	1,467 85
Sec. No. 104, do	Excavation	13,460	at	9	
	Embankment			12½	
	Grubbing			$246 00—	1,457 40
Sec. No. 105, do	Excavation	10,320	at	8	
	Embankment	2,860	at	10	
	Grubbing			$30 00—	1,141 60
Sec. No. 106, do	Excavation	10,920	at	7	
	Embankment	5,680	at	10	
	Grubbing			$20 00—	1,352 40
Sect. No. 107, do	Excavation	13,680	at	8	
	Embankment	19,020		10	
	Grubbing			$120—	3,116 40
Sect. No 108 do	Excavation	10,850	at	8	
	Embankment	5,740		12	
	Grubbing			$ 90—	1,646 80
Sect. No 109 do	Excavation	4,238	at	8	
	Embankment	9,550		12	
	Grubbing			$ 50—	1,535 04
Sect. No 110 do	Excavation	13,000	at	8	
	Embankment	6,480		11	
	Grubbing			$28	
	Slate rock	400		48	
	Vertical wall	800		47—	2,348 80
Sct. No 111 do	Excavation	1,720	at	7	
	Embankment	21,500		10	
	Puddling	4,800		12½	
	Vertical wall	4.883		45	
	Grubbing			$120—	5,187 75
Sect. No 121 do	Excavation	11,160	at	8½	
	Embankment			11	
	Grubbing			$312—	1,260 60
Sect. No 122 do	Excavation	11,496	at	9	
	Embankment			12	
	Grubbing			$326—	1,360 64
Sect. No 123 do	Excavation	14,200	at	9	
	Embankment	400		11	
	Grubbing			$ 314—	1,636 64
Sect. No 124 do	Excavation	8,760	at	9	
	Embankment	5,490		12½	
	Grubbing			$ 342—	1,860 45
Sect. No 125 do	Excavation	12,140	at	9½	
	Embankment	200		12½	
	Grubbing			$ 45—	1,223 30

Sect. No 126 contains	Excavation	12,680	at	9	
	Embankment	2,000		5	
	Grubbing			$ 30—	1,480 20
Sect. No 127 do	Excavation	8,090	at	7¾	
	Embankment	4,740		11	
	Grubbing			$ 25—	1,173 36
Sect. No 128 do	Excavation	7,640	at	8	
	Embankment	8,430		15	
	Grubbing			$20—	1,895 70
					$77,937 50

LOCKS.

No 4	5 feet lift at Paddle gates	$149 75	per foot	$ 748 75 160
No 5	10 feet lift at Paddle gates	149 75	do	1497 50 160
No 6	10 feet lift at Paddle gates	149 75	do	1497 50 160
No 7	10 feet lift at Paddle gates	149 75	do	1497 50 160
No 8	7 feet lift at Paddle gates	149 75	do	1048 25 160
No 9	7 feet lift at Paddle gates	149 75	do	1048 25 160
	Cost of locks			$8297 75

AQUEDUCTS.

One across Fishing creek 182 feet long at $10		1820
833 perches masonry	1 50	1249 50
One across Mahoning creek, 60 feet long	6 31	378 60
360 perches masonry	1	360
One across Lodges run, 50 feet long	7 50	375
362 perches masonry	2 50	805
One culvert on section 94, will cost		225
		5113 10
Amount of locks brought down		8297 75
Amount of sections		77.937 50
Whole amount of work under contract		$91,348 35

Estimated cost of work on the North Branch Division, Pennsylvania canal, which has not been contracted for.

Sect. No. 74, contains	Excavation	11,020	at	8	$ 881 60
	Embankment	2,450		10	245
	Grubbing			$40	40
					1166 60

Sect. No 75	contains	Excavation	31,400	at 12	
		Embankment		2	
		Grubbing		$60—	3828
Sect. No 76	do	Excavation	10,840	at 9	
		Embankment	600	11	
		Grubbing		$ 45—	1086 60
Sect. No 77	do	Excavation	7690	at 8	
		Embankment	2340	10	
		Grubbing		$45—	894 20
Sect. No 78	do	Excavation	14,300	at 8½	
		Embankment	450	10	
		Grubbing		$ 45—	1303 50
Sect. No 79	do	Excavation	9502	at 9	
		Embankment	1200	11	
		Grubbing		$ 45—	1032 18
Sect. No 91	do	Excavation	11,196	at 9	
		Embankment		10	
		Grubbing		$ 20—	1027 64
Sect. No 92	do	Excavation	14,002	at 9	
		Embankment			
		Grubbing		$ 176—	1436 18
Sect. No 93	do	Excavation	13,842	at 10	
		Embankment	275	13	
		Grubbing		$ 330—	1749 95
Sect. No 97	do	Excavation	5780	at 9	
		Embankment	7884	11	
		Grubbing		$ 100—	1487 44
Sect. No 98	do	Excavation	10,484	at 9	
		Embankment	600	10	
		Grubbing		$ 260—	1263 56
Sect. No 112	do	Excavation	12,860	at 8	
		Embankment	1,700	12	
		Grubbing		$25—	1257 80
Sect. No 113	do	Excavation	12,600	at 9	
		Embankment	100	at 11	
		Grubbing		10 00—	1156 00
Sect. No 114	do	Excavation	13,094	at 9	
		Embankment		12	
		Grubbing		25 00—	1208 46
Sect. No 115	do	Excavation	10,420	at 10	
		Embankment	1,070	12	
		Grubbing		10 00—	1180 40
Sect. No 116	do	Excavation	18,120	at 12	
		Embankment	460	12	
		Grubbing		26 00—	1655 60

Sect No 117 contains	Excavation	11,341	at	11		
	Embankment	700		11		
	Grubbing			150 00—	1496	51
Sect. No 118 do	Excavation	14,444	at	11		
	Embankment	280		12		
	Grubbing			48 00—	1670	44
Sect. No 119 do	Excavation	14,104	at	10		
	Embankment			10		
	Grubbing			35 00—	1445	40
Sect. No 120 do	Excavation	10,840	at	10		
	Embankment	1,060		12		
	Grubbing			108 00—	1219	20
					28,680	56

Culvert on section	No 74 will cost		175,00
do	do 81		45 00
do	do 84		40 00
do	do 99		46 00
do	do 103		50 00
do	do 112		215 00
do	do 118		50 00
28 farm bridges	at $ 200 each		5,600 00
12 road do	250		3,000 00
		9, 21	00
Amount of sections brought down		28,680	56
Whole amount of work, not under contract		$ 57,901	56

No. 6.

A list of superintendents, engineers, assistant engineers, &c. employed on the North Branch Division of the Pennsylvania canal.

Thomas Woodside, superintendant	3 00	per day
Charles T. Whippo, principal engineer,	$ 2,000	per year
John Bennet, assistant engineer,	4 00	per day
Henry H. Petre do	3 50	
Matthew R. Stealy, draftsman	2	
Thomas Bennet, assistant do	2	
Lord Butler do	2	
George Mack do	2	
George Shoemaker do	2	
Thomas E. Paine, surveyor	2	
Francis G. Murray, assistant	1 50	
Houghton B. Robison, rodman	1 50	

STATEME ennsylvania Canal, since its commencement
up to the 1 each section and the amount of per centage
retained.

No. of Sections		PERCHES. Vertical wall	PERCHES. Outer slope wall.	SQ. YDS Inner slope wall.	Cost of work estimated.	Per centage retained	Sums paid.
					Dolls. Cts	Dolls. Cts.	Dolls.
2	Jacob B.	2523			1620 27½	324 27½	1296
3	Patterso	950			943	188	755
4	Cady, C	550			544	109	435
5	Frederic	928			873 60	174 60	699
6	Henry A				1183	238	950

Charles T o 10th October, 1828.
John Ben 10th October, 1828.
F. H. Pe
George M do
Miller Fo 10th November, 1828.
William
Lord But
Mathew 10th October, 1828.
Thomas H to do do
Francis C to do do
George S to do do
Thomas J to November 15, 1823.
George P to October 31, 1828.
Houghton November 15, 1828.
Ezra C. o 19th October, 1828
David Cu 18th September, 1828.
Niles Be ber to 15th November, 1828.
Stephen er to 15th November, 1828.
Artemid November, 1828.
James G to 8th October, 1828.
William o 25th August, 1828

Thomas
The seve day of July, 1823, amounts to $1756 13
Exclusiv 2262 00

Making 4018 13
Paid

itted.

Branch Division Penna. Canal.

Dan

Sect No 117 contains	Excavation	11,341	at	11		
	Embankment	700		11		
	Grubbing			150 00—	1496	51
Sect. No 118 do	Excavation	14,444	at	11		
	Embankment	280		12		
	Grubbing			48 00—	1670	44
Sect. No 119 do	Excavation	14,104	at	10		
	Embankment			10		
	Grubbing			35 00—	1445	40
Sect. No 120 do	Excavation	10,840	at	10		
	Embankment	1,060		12		
	Grubbing			108 00—	1119	20
					28,680	56

Culvert on section	No 74 will cost		175,00
do	do 81		45 00
do	do 84		40 00
do	do 99		46 00
do	do 103		50 00
do	do 112		215 00
do	do 118		50 00
28 farm bridges	at $ 200 each		5,600 00
12 road do	250		3,000 00
			9, 21 00
Amount of sections brought down			28,680 56
Whole amount of work, not under contract		$	57,901 56

No. 6.

A list of superintendents, engineers, assistant engineers, &c. employed on the North Branch Division of the Pennsylvania canal.

Thomas Woodside, superintendant	3 00	per day
Charles T. Whippo, principal engineer,	$ 2,000	per year
John Bennet, assistant engineer,	4 00	per day
Henry H. Petre do	3 50	
Matthew R. Stealy, draftsman	2	
Thomas Bennet, assistant do	2	
Lord Butler do	2	
George Mack do	2	
George Shoemaker do	2	
Thomas E. Paine, surveyor	2	
Francis G. Murray, assistant	1 50	
Houghton B. Robison, rodman	1 50	

A STATEMENT exhibiting the quantity of work done on the North Branch Division of the Pennsylvania Canal, since its commencement up to the 15th of November, 1828, the total cost thereof at contract prices, the sum paid on each section and the amount of per centage retained.

No. of Sections	Names of Contractors.	Estimated value of rubbishing on the line done.	CUBIC YARDS: Excavation of common	Embankment	Solid rock	Slate Rock	Detached do	Hard pan	Pudding	PERCHES: Vertical wall	Overbridge wall	Inverted arch wall	Cost of work estimated.	Per centage to be retained.	Sums paid.
		Dolls.											Dolls. Cts	Dolls. Cts.	Dolls.
2	Jacob B. Barse and James Middler	48	1000	837						2323			1620 27½	324 27½	1296
3	Patterson, Petrikin, Tamany and Co	42	800				880			950			943	188	755
4	Cady, Comstock and Dickinson	50	850				460			550			544	109	435
5	Frederick Pratt	40	4300						216	923			873 60	174 60	699
6	Henry J. Fritcher	20	14600										1483	238	930
7	Peter Bargy and Warren Mack, jr.	15	5600										611	126	505
8	Frederick Pratt and James D Treat	10	1600										162	32	130
9	Robert M'Reynolds and Peter F. Mody	48	12534										1500 91	300 91	1200
10	Drumheller and Gitt	60	8160										870	174	696
11	Tuttle, Ferrell and Comstock	15	4300										455	91	364
12	M'Reynolds and Mody	15	1400										176	35	141
13	Dodd, Hale and Drake	10	9682										1026 51	205 61	821
14	A. Y. Moore, E. S. Moore and J. Deen	25	1600				365	650			265		648 85	188 85	514
15	William Pratt	48	4800		155		208	415			788		1296 60	233 60	973
16	Gallup, Dean and Thomas	10	7000										710	142	568
19	William Pratt		1300										130	26	104
20	Ab-m Day	85	500		50		500	500		733			1172 25	234 25	938
22	C. H. and E. W. Cook	50	7000										680	136	544
23	same	50	2600								632		843 80	168 80	675
24	Shields and Emery	50	2400										350	70	280
26	Frederick Pratt	130	4500				200	250			800		1303 50	260 50	1043
27	Forsyth, Jones and Wilson	150	1300	1000			25	220			1300		2521 45	504 45	2017
28	Hugh Stewart	160	6260		75		75	1260			1065		1415 80	282 80	1133
30	Moorhead Beard and Koons	130	300		889		880			1920			2040 20	408 20	1632
31	same	25	6350				75	5283				806	2240 08	448 08	1792
32	John Hanegan and Nicholas Egan	20	1609				40	556					309 74½	61 74½	248
34	L. H. Phillips and Thomas Plews	40	5130										553	111	442
36	Samuel Everitt	60			50								85	17	68
37	same	60	3300				175						427 50	85 50	342
38	Thomas Patrick and James Moore	50	4500										500	100	400
39	same	50	550										99	19	80
40	Tuttle, Ferrell and Carmichael	30	9346								310		1081 94	216 94	865
41	Rudman, Reynolds and Co	45	7600					1000					909	182	727
43	Beach and Everitt	85	650										106	21 50	85
44	same	10	8700										967	194	773
45	Alexander Jamieson	15	4411	14696									2184 51	436 51	1748
46	Thomas M Scott	5	100	1800									202	40	162
47	Jesse Hicks	125	200										147	29	118
48	Bevins & Cummings—re-let to Ferrel & Kelly	75	507			400	100	1900					850 70	170 70	680
49	Cain and Brenner	15	4834				75	4600					1094 38	218 38	876
50	Simons and Carolyn		4350				85	1100					723 25	144 25	578
51	Robert Leston	75	600			450	400	3500				1001	1664 17	332 17	1332
52	Steadman, Hodge and Kelly	40	4158	700		100	50	750					774 80	154 80	620
53	Patterson, Petrikin, Tamany and Co.	80	6764				100	924					977 82	195 82	782
54	Elijah Russell	174	4490			1450	75	1100					1456 75	290 75	1161
55	Jacob B Barse and Jacob Middler	180	1000				644	500			965		1110 75	222 75	888
56	Blanchard and Holden	180	6062				1345	3031			1853		2754 58	550 58	2204
57	Stanton and Arnold	40	3060				50	645					425 90	84 90	341
58	L. H. Phillips and Thomas Plews	80	1270	1778			75				1596		1496 65	299 65	1197
59	same	100											100	20	80
60	same	100											100	20	80
63	Michael O Brian	22	8483				45	1741					777 47	155 47	622
64	John and Jesse Bowman	30	7274	8432			400	1722					2294 51	458 51	1826
65	L. Spangenberg and H. Charles	20	3,68				20	150					329 12	66 12	263
66	Hiram and Elbert W. Cook		20 0				35	250					356 50	71 50	285
67	Jesse Bowman	25	3076			2052							743	149	594
68	John Thompson	60	3068				50	750					428 63	85 63	343
69	Anthony Grove and James Fox	250	2290					800					518	104	414
70	Peter Bargy and Warren Mack, jr.	170	4400				35	193					685 82	107 82	529
71	Uzal Hopkins	15	5800					138					615 70	123 70	492
72	D. Spangenberg and H. Charles	50	7234	3164				1994					1577 28	315 28	1262
73	Jacob Custenbader	200	3853	263				257					743 27	148 27	595
			253994	32270	1219	4452	7476	34476	216	7504	9014	1307	55365 17	11046 17	44319

A LIST of the superintendents, clerks, engineers, assistant engineers and subalterns, employed on the North Branch Division, Pennsylvania canal, exhibiting also their wages, and the sums paid to each person for their services, since the 10th day of July, 1828.

Names.	Stations.	Wages.	Paid to each.	Time.	Periods of time.
Charles T. Whipple,	Principal engineer,	$2000 per annum.	$ 1000	2 quarters,	From 10th April to 10th October, 1828.
John Bennet,	Principal asst. eng.	$4 00 per diem.	372	93 days.	10th July to 10th October, 1828.
E. H. Petrie	do do	3 50			do do
George Mack,	Assistant engineer,	2 00	186	93 days,	do 10th November, 1828.
Miller Fox,	do do	2 00	262	131 do	
William Petrie,	do do	2 00			
Lord Butler,	do do	2 00			
Mathew R. Stealey,	Draftsman,	2 00	186	93 do	10th July to 10th October, 1828.
Thomas E. Paine,	Surveyor,	2 00	186	93 do	do to do do
Francis G. Murray,	Rudman,	1 50	139 50	93 do	do to do do
George Shoemaker,	do	1 50	139 50	93 do	do to do do
Thomas Bennet,	do	1 50	190 50	127 do	do to November 15, 1828.
George P. Bowen,	do	1 50	112 50	75 do	18th August to October 31, 1828.
Houghton B. Robinson,	do	1 50	165	110 do	29th July to November 15, 1828.
Ezra C. Mitchell,	Axeman,	1 00	19	19 do	1st October to 19th October, 1828
David Culver,	do	1 00	52	52 do	29th July to 18th September, 1828.
Niles Bentley,	do	1 00	62	62 do	15th September to 15th November, 1828.
Stephen R. Clarke,	do	1 00	11	11 do	5th November to 15th November, 1828.
Artemidorus Ingersoll,	do	1 00	108	108 do	31st July to November, 1828.
James Gordon,	do	1 00	54	54 do	17th August to 9th October, 1828.
William Caldwell,	do	1 00	17	17 do	9th August to 25th August, 1828
			2,262 00		

Thomas Woodside superintendent, at $3 per day, and Ellis Hughes clerk, at $2 50 per day.

The several sums paid to persons employed in the engineering service on the said division, previous to the 10th day of July, 1828, amounts to	$1756 13
Exclusive of the salary of the principal engineer—to which add the above,	2262 00
Making the sum of	4018 13

Paid persons employed in the engineering service, since the location of the said division.

All of which is respectfully submitted.

Superintendent N. Branch Division Penna. Canal.

Danville, December 1, 1828.

James Chamberland	Rodman	$ 1 50
William Petre	do	1 50
John Chalhoone, axeman		1
Niles Bentley	do	1
William M'Name	do	1
Stephen R. Clark	do	1
Isaac Welsh	do	1
Ellis Hughes, clerk		2 50

THOS. WOODSIDE,

Superintendent N. B. Division, Penn. canal.

Harrisburg December 9, 1828.

Series 7.

DOCUMENTS RELATING TO THE WEST BRANCH DIVISION.

No. 1.

Report of the Survey of a canal line on both sides of the West Branch from Northumberland to Bald Eagle—by F. W. Rawle, engineer.

To the Board of Canal Commissioners of Pennsylvania.

GENTLEMEN,

I have the honor of submitting to you a report, together with plans and estimates, of an explored line, and location of canal in the valley of the West branch of Susquehanna, on the western, and on the eastern side of that river, from Northumberland to the Bald Eagle.

The survey on the western side was commenced at the head of the Susquehanna division, at the blue hill, and continued to a point on the Bald Eagle creek, two miles above the mouth of that stream. A line of canal connecting the Bald Eagle with the river, near Reed's run, was then laid; and the survey on the eastern side was commenced at the last mentioned point, and ended at Northumberland.

The course of the survey will be traced on the two sides, and described in a brief manner, by sections generally corresponding with those in the estimates. which are divisions of distances marked by well known boundaries through the country.

WESTERN SIDE.

The passage of a portion of the Blue Hill is effected by the Susquehanna division, in the pool of the Shamokin dam, guarded by a towing path embankment, and wall. For the remaining part of the

distance, which now falls within this survey, the same level, and a similar mode of construction is adopted. From the pool, the level is raised by three locks to the bottom land of dry valley, through which it passes on good ground, with medium cutting, to Turtle Creek, at the commencement of the Vine Hills. Having passed the creek by an aqueduct, the canal is forced into the river in order to pass the bluff rocks of the hills extending to the waters edge, and a heavy wall is required to support the embankment in that distance. Leaving the rocks, the opening of Buffaloe Valley is gained, and favourable ground for a canal is found, which continues as far as Buffaloe Creek, at Derrstown. At Buffaloe creek an aqueduct of 250 feet in length is required, and a considerable embankment is necessary to sustain the level over the bottom lands of that stream. From this point to the hills nearly opposite Milton, 3 miles in distance, the ground is generally favourable, with the exception of the slate sideling at Musser and Wilson's farms.

In passing the hills, the embankment must be guarded by a wall at canal slope.

Leaving this point, the bottom land again opens, and the range of ground being here extensive, two lines were run. That nearest the river being established, it is carried with excavation generally good, as far as White deer mountain, passing in its course the saw mill stream at New Columbia and White Deer creek at Dan Caldwell's mills: the latter of these streams requiring an aqueduct. At White Deer mountain the ground rises at a steep slope from the river, and the level is consequently required to be sustained by high embankment, and sufficient protection wall. At the end of this embankment, White-deer-hole creek falls into the river, and the valley of that name opens. Through this range of level ground which reaches as far as the bluffs at Black run, the excavation is favorable. At the bluffs, and at Penny hill, which falls in very soon afterwards, an embankment and wall is again required, extending nearly to Black Hole run. The valley called from this run, here commences, and is an opening of considerable extent. A choice of ground again occurring, two surveys were made nearly through its whole length. The line passing nearest to the foot of the hills was adopted, and it affords, without any material exception, good excavation as far as the head of the bottom land at the great turn of the river. Here the Bald Eagle mountain commences, forming the southern boundary of the river valley, as far as the survey was carried, and which, from its base falling so frequently within the line of canal, in that distance, causes the most difficult and expensive part of the line. The part that bears this character most strongly, begins at the point already referred to, and extends without any alteration in appearance, for nearly 5 miles.

Difficulty of procuring on the ground the materials necessary for the construction of embankment, is much to be apprehended; while at the same time, much labor will be required, effectually to preserve the water of the canal on a hill side so strong. The protection wall necessary, does not in the estimate, form a proportionate item of the expense; the best materials for that construction being

found along the whole length. At the head of this section, it is proposed to construct a feeding dam in the river, to the height of 4 feet, near what is called the "Race ground." From this dam the level is raised, and after passing another mile, partly through a strip of bottom land, and partly along the mountain, the line enters the bottom, beginning oppposite to the mouth of Loyalsock, near Porter's house. Through this range the ground is for the most part favourable, but in some places requires some extra excavation, and considerable embankment. The upper end of the bottom rises to a hill, and it is necessary from that point, to carry the canal by wall and embankment, along the margin of the river, by Caldwell's mills. After passing this, and a short distance of easy excavation, the line again encounters the base of the mountain, along which it is carried up to the lower Nippenose bottom. This section of the mountain, offers rather less difficulty than that before mentioned; materials for construction being more convenient. Through the Nippenose bottom, the best line was found, to be through the wet ground, and timber land, in the range of the back farms, and which may be considered as generally favourable, some extra excavation however occurring. This bottom land ceasing, another section of wall and embankment occurs, and continues to the upper Nippenose bottom. Through this land the line was generally similar to that in the lower Nippenose, with the exception of deep cut at the upper end, necessary to avoid a considerable of embankment in the river. This point being passed, the line is thrown upon the steep sideling below Antes' mill, past which, and the Nippenose creek, it is carried principally on such ground, till it once more meets with the Bald Eagle mountain. This section of the mountain continues up to Love's Bottom, and is of considerable length, meeting with some relief however, at Jacob Antes' farm. Through the lower part of Love's bottom, the excavation was at the medium with a good line; but at the high ground at Quigleys', it increases to a considerable depth, which it was preferred to encounter, rather than be again forced to the river. From this cut to the upper end, a good line is generally found. Leaving this range of bottom land which is extensive, the line is carried chiefly along the mountain, with occasional intervention of level strips of sufficient width, up to the mouth of the Bald Eagle creek, and thence along its bank two miles farther, to the head of the survey.

Having arrived at this point, which it was necessary to reach, in order to gain a proper height for the level established, and at the same time a convenient place for the construction of a dam, both for the purpose of feeding the canal, and of affording a sufficient harbor, the first enquiry was the means of forming a connexion with this point and the river.

Survey across the point from Bald Eagle to the River.

Examinations were accordingly made, and itwas deemed advisable to form this connexion, by a cut taken out of the river a short distance above Reed's run, and carried across what is called the point,

in a distance of three quarter's of a mile. A dam in the river was therefore established, at a level with that on the Bald Eagle, and a line of canal connecting them was laid. Advantage being taken of the low ground through Robert Stewart's place, the excavation is kept at a medium until it approaches the river bank, where for a short distance it is deep. By this arrangement it is thought, that on either side of the river valley, it may be determined to carry the canal, the trade of the Bald Eagle country, and that of the West Branch, will equally be accommodated, while at the same time, a most permanent supply of water will be afforded.

EASTERN SIDE.

Having fixed upon this plan as the most satisfactory for either canal, the survey on the eastern side was begun. With the level of the two dams, the line proceeds downwards, and is carried round the limestone and slate bluffs, near the head, by wall and embankment, thence through the bottom land at Dunnstown, and again by the bluffs below, at the end of which it enters an extensive level range, and medium cutting is soon attained. From this point similar excavation is found, until it reaches Chatham's run, where some embankment is required at the crossing of that stream, below Ferguson's mill. From thence it is carried over good ground until it approaches Pine creek, where in order to keep up the level for an aqueduct, some embankment is again necessary. This creek being passed (by aqueduct of 300 feet in length) the line assumes the proper cutting, as far as the sand hills, above Jersey Shore, where, in order to save distance, and to secure a better passage by that town, some extra cutting is encountered. From thence on, no difficulty is met with till Larry's creek is reached; here an aqueduct is required, and a high embankment over the creek bottom, and here commences the most expensive part of the work on this side of the river. This is owing to the necessity of constructing a wall and embankment of extra height and dimensions round the bluffs below the creek, while this expense is increased by the difficulty of procuring good stone on the ground. Material for embankment can however there be had. Leaving the bluffs, and passing through some cutting, the line is carried under fabourable circumstances to the lower end of Hughes' farm. From this point down to the mouth of Queenashahoque run, some paving against the sideling will be required, and passing the stream, some excavation will be encountered at the slate bluffs below. The next section carries us over good ground to the town of Newberry at Lycoming creek. The crossing of this creek, and the low grounds adjacent was next to be considered, and it was concluded to keep up the level, and pass by an aqueduct and embankment: by which the interference with the mill power of the stream would be avoided, and a much better line in plan obtained. Some considerations however, relative to the descending trade of that stream may, upon a review of the ground, enter into the decision.

Leaving this point, after some cutting favourable for the embank-

ment, the line pursues a very good course through the second bottom, overcoming the declivity of that ground by two eight feet locks, and thence passes on the northern skirt of Williamsport, where striking on to the sideling of Woodward's run, continuing along this a short distance, and then crossing the public road it gains the alluvial bottom. In order to ascertain which kind of line could be carried through the river streets of the town, consequent on the adoption of another course from Lycoming creek, a second survey was made, and ended at the point referred to. Under any other circumstances, the previous line would be preferable.

The next section carries the canal over very good ground, with proper excavation, until it reaches the bank of Loyalsock creek. The passage of this creek was obviously to be effected by a dam and guard lock, the keeping up of a high level being difficult to accomplish. The line was accordingly carried a short distance along the bank and thence across the creek, accommodating the level of the canal to that of the dam of Burrows' mill. Leaving Loyalsock creek, no variation of any consequence from a desired line is met with, until arriving at the ponds in the neighbourhood of the mill stream, at the Muncy farm, and of Wolf run below. Some embankment is required, and considerable cutting through a clay and slate here occurs.

The crossing of Muncy creek is then effected. An aqueduct and a high embankment for a short distance are necessary. From this point, with medium ground again attained, the line holds its course, passing the town of Pennsborough, to the bluffs above the Muncy hills; after passing which by a deep cut, and some further distance of favorable ground, the Muncy hills are reached. Here the level was dropped by three locks into the pool of a dam, to be erected for a feeder at the Sugar Camp island below. The passage of these hills will therefore be accomplished in the pool, protected by a towing path formed of slate excavation as far as the dam, and thence by a canal secured by wall and embankment.

Entering the land again, which, from the formation here, does not occasion the usual cutting consequent on a depression of the level, a good line of canal is again commenced, and continues along with the various slopes of ground, passing Watson's-town, where a short distance of paving on the river bank will be required, and the Warrior run, with a large culvert and some embankment, until it reaches Milton. At this town it is carried through the back lots, with few intervensions of buildings, but passing over the head race of the mill on Limestone run. The next distance passed over is to Chilisquaque creek, and in reaching which, the best ground was found in the neighborhood of the big marsh, any where medium excavation was afforded. The line crosses Chilisquaque with an aqueduct, at a favorable point below Wilson's mill, and from thence holds its course, with gentle sideling and level cutting of little variation, till it reaches the point at the town of Northumberland.

At the point the junction with the North Branch canal is formed. No arrangement was made for the necessary accommodation of a basin, nor for the outlet locks, &c. these works being common to the two canals, will be more properly considered in conjunction with the engineer on the North Branch.

In comparing the surveys thus described, in reference to their estimated cost, it will be seen that the excess of the western over the eastern side, is principally caused by the necessity of constructing the canal along the steep slopes or abrupt sides of the mountains that on the western side so frequently bound the river. The disproportion on the two sides in this respect, is very great. On the western side, however, in almost all instances, the formation of these slopes admitted of a construction generally considered the most economical, on the eastern side, particular circumstances, where such places occurred, required a construction of more expense.

The calculation for the area of the canal, were made upon the usual dimensions now adopted for the Pennsylvania canal—I propose to build the locks with dry walls of rough stone, and planked in the bottom and sides upon timbers secured in a proper manner. The aqueducts to be built with wooden trunks, supported by abutments and piers of rubble stone work laid dry.

Culverts laid in lime mortar.

Respectfully submitted,

F. W. RAWLE,
Engineer.

Milton, August 16, 1828.

Estimate of cost on the western side.

Section 1.

From Susquehanna division to the upper end of Blue Hill—length 1 mile and 126 perches.

Towing path at Blue Hill—length 1 mile and 126 perches —containing 98,000 cubic yards at 25 cts.	$24,500	
Wall on slopes 2 by 21, 1 mile and 126 perches, containing 12,348 perches, at $1	12,348	
Three locks of 7 feet lift $2720 each	8,160	
		45,008

Section 2.

From Blue Hill to Turtle creek—length 3 miles and 40 perches.

Excavation, clay loam 59,375 cubic yards at 11 cts.	6531	
Two 6 feet culverts at $300 each	600	
One 12 feet do Dry valley run	1,000	
Grubbing	600	
Bridges—3 farm bridges at $250 each	750	
		9481

Section 3.

From Turtle creek to the head of Vine Hills—length 1 mile and 160 perches.

Aqueduct at creek		$2,500	
Excavation, clay 44,263 cubic yards at	11	4,869	
Wall at 2 inch batter, 7 by 22, length 144 lineal perches, 14,636 cubic perches, at $1		14,636	
Embankment, 144 lineal perches, 40,480 yards, at 15 cents		6,072	
One lock 8 feet lift		2,870	
Grubbing		200	
			31,147

Section 4.

From Vine Hills to Buffaloe creek—length 1 mile and 280 perches.

Excavation, clay, 33,250 cubic yards, at	10	3,325	
Embankment 11,953	13	1,554	
One 8 feet culvert		800	
Grubbing		50	
Bridges at Derrstown—1 public road at $800, 2 for streets $350 each		1,500	
Bridges for farms—4 bridges at	250	1,000	
			8229

Section 5.

From Buffaloe creek to hills opposite Milton—length 3 miles and 80 perches.

Aqueduct at creek, 250 feet long			$6900	
Embankment	72,452 cubic yards at	12	8694	
Excavation sideling slate	39,893	15	5984	
do clay	53,641	10	5364	
do rock	3,100	50	1550	
Slope wall 2 by 28, length 80 lineal perches, 2956 perches		50	1478	
Two 4 feet culverts at $250 each			500	
Grubbing			100	
Bridges—5 farm bridges at $250 each, 1 public road $800			2050	
				32,620

Section 6.

From the hills to White Deer mountain—length 5 miles and 228 perches.

Excavation, loam, 108,537 cubic yards at	11	$11,939	
One lock 7 feet lift		2,720	
Aqueduct at White Deer creek		2,160	
One 6 feet culvert		350	
One 10 feet do		1,500	
Embankment, 15,375 cubic yards at	13	1,998	
Grubbing		500	
Bridges—7 farm bridges at $250 each, 1 public road $800		2,550	
			23,717

Section 7.

From White Deer mountain to Penny Hill—length 4 miles and 260 perches.

Embankment at mountain, length 230 perches, 70,278 cubic yards at 15	10,541	
Slope wall at mountain, length 230 perches, 8,506 cubic yards at $1	8,500	
Aqueduct at White Deer hole creek	2,175	
Excavation, loam, 61,503 cubic yards at 10	6,150	
One lock 7 feet lift	2,720	
Embankment at Penny Hill, length 1 mile 100 perches, 128,333 cubic yards at 15	19,250	
Slope wall at Penny Hill, length 1 mile 100 perches, 15,523 perches at $1	15,523	
Excavation, slate clay, 17,355 cubic yards at 12	2 082	
One 4 feet culvert	250	
One 16 feet do at Black run	1,973	
Embankment at do 8000 cubic yards at 13	1,040	
Grubbing	600	
Bridges—2 farm bridges, $250 each, 1 public road $800	1,300	
		72,104

Section 8.

Through Black Hole valley to Bald Eagle mountain—length 7 miles 160 perches.

Excavation, loam, 199,470 yards at 10 cents	19 947	
One lock 7 feet lift	2,720	
Two do 8 do at $ 2870	5,740	
One 6 feet culvert	350	
Grubbing	1,600	
Bridges—8 farm bridges at 250 each, 1 public road 800	2,800	
		33,157

Section 9.

Bald Eagle mountain—length 4 miles 240 perches.

Embankment	464,442 yards at 35 cents		162,554	
Slope wall	56,178 perches	75	42,134	
Puddling in bottom and on berm side	105,598 yards	67	89,599	
Excavation	23,466	20	4,693	
Dam at race ground			4,000	
Guard lock			3,750	
Grubbing			1,5 0	
				258,230

Section No 10.

Bald Eagle mountain to Porter's bottom—length 1 mile.

Excavation, gravel & clay	12,208 yards at		12	1,465
do clay	4.155		11	457
Guard bank	9,680		12	1,161
Embankment, 160 perches in length	48,888		25	12,222
Slope wall 160 do	5,918 perches		75	4,438
Two locks 8 feet lift	$ 2,870			5,740
Grubbing				250
				25,733

Section 11.

Through Porter's bottom—length 4 miles 60 perches

One lock 8 feet lift				2,870
Excavation, loam	64,484 yards at		10 cents	6,448
Embankment	65,706		15	9,856
Excavation, gravel and clay	43,400		13	5,642
One culvert 20 feet chord at Hagerman's run				2,100
One 4 feet culvert				275
Grubbing				450
Bridges—6 farm bridges at 250 each, 1 public road at 800				2,300
				29,941

Section 12

From Porter's bottom to mountain above Caldwell's mill—length 1 mile 160 perches.

Excavation, clay	23,863 yards at		11 cents	2,625
Embankment 260 perches in length	79,443		20	15,888
Slope wall 260	9,608 per.	$1	25	12,011
1.10 feet culvert				1,200
Grubbing				200
Bridges—2 farm bridges at $ 250				500
				32,424

Section 13.

Bald Eagle mountain—Length 2 miles and 50 perches.

Embankment	210,831 yards at		25 cts	52,707
Slope wall	25,502 per		80	20,401
Grubbing				500
				73,608

Section 14.

Through lower Nippenose bottom—Length 4 miles 88 perches.

Excavation, clay	68,323 yards at		11 cts	7,515
do. do. & gravel	52,702		12	6,324
Embankment	10,555		15	1,583
One lock 8 feet lift				2,870
One 4 feet culvert				275
Grubbing				750
Bridges—6 farm bridges at $250 each—1 public road $800				2,300
				21,617

Section 15.

Bald Eagle mountain—Length 1 mile 240 perches.

Embankment	171,1 9 yards at	30 cts	51 332	
Slope wall	20,697 perches	80	16,557	
Grubbing			450	
				68,339

Section 16.

Through Upper Nippenose bottom—Length 3 miles 35 perches.

Excavation, clay	108,500 yards at	12 cts	13,020	
do. deep cutting	74,348	20	14,869	
One lock 8 feet lift			2,870	
Grubbing			1,300	
Bridges—6 farm bridges at $250 each—2 public road $800 each			3,100	
				35,159

Section 17.

From Upper Nippenose to Love's bottom—Length 4 miles 160 perches.

Embankment 240 perches in length	73,332 yards at	15 cts	10,999	
Slope wall 240	8,870 per.	$1	8,870	
Excavation, clay & gravel	37,975 yds.	12	4,557	
1 culvert 20 feet chord at Nippenose creek			2,800	
Embankment at culvert	19,799	13	2,573	
do. at mountain 2 m. 230 perches	265,830	30	79,749	
Slope wall 2 m. 230 p.	32,154 per.	80	25,723	
Grubbing			750	
Bridges—1 farm bridge at Jacob Antes'			250	
				136,271

Section 18.

Through Love's bottom—Length 6 miles 30 perches.

Excavation, deep cut at Quingley's	122,027 yards at	20 cts	24,405	
do. clay	86,800	12	10,416	
do. loam	63,535	10	6,353	
1 lock 8 feet lift			2,870	
One 4 feet culvert			275	
Grubbing			850	
Bridges—10 farm bridges 250,2 public roads		800	4,100	
				49,269

Section 19.

From Love's bottom to head of survey on west side—Length 2 miles 294 perches.

Embankment 160 perches in length	48,888 yards	at 25 cts	12,222	
Slope wall 160	5,913	80	4,730	
Embankment 1 mile 80 per. on B. E. creek	86,044	20	17,208	
Slope wall 1 m. 80 per.	11,616	80	9,292	
16 feet lock			2,620	
Excavation, clay	57,736	12	6,088	
1 guard lock			2,800	
Grubbing			450	
				55,410

Section 20.

From head of survey on west side across the *point* to the river—Length 240 perches.

Dam at Bald Eagle creek			1,380	
Excavation, sandy loam	13,298 yards	at 9 cts	1,256	
do. cutting	23,949	15	3,591	
2 guard locks 2,500 each			5,000	
Dam at Susquehanna			9,320	
Bridges—2 public roads at 800 each			1,600	
				22,147
Total distance 66 miles 132 perches.			Total $	1,063,611

Estimate of cost on the eastern side.

Section No. 1.

From Bald Eagle to the river—length 240 perches,			
Dam at Bald Eagle creek,		$1,380	
Excavation, sandy loam,	13,298 yds at 9	1,256	
do cutting,	23,949 yds at 15	3,591	
Two guard locks $2,500 each		5,000	
Dam at Susquehanna,		9,320	
Bridges, two public road at $800		1,600	
			22,147

Section No. 2.

From the river dam to Dunnstown—length 215 perches.

Guard lock,		$3,000	
Embankment,	46,247 yds at 20	9,249	
Wall at two inches batter, 7 feet by 22 high,	21,849 pr. $1 25	27,311	
Grubbing,		150	
			39,710

Section 3.

From Dunnstown to end of Bluff rocks—length 280 perches.

Excavation cutting,	37,155 yds at	12	$4,458	
Embankment, 90 pr. in length	19,359	20	3,871	
Wall at 2 inch batter, 90 per.	9,147	$1 25	11,433	
Grubbing,			50	
Bridges, two farm bridges, $250 each,			500	
				20,312

Section 4.

From Bluff rocks to Ferguson's mills—length 2 miles 280 per.

Excavation, clay,	72,618 yds at	11	$7,988	
Embankment at Chatham's run	26,693	13	3,470	
Two culverts 10 ft. chord $1,200 each,			2,400	
Grubbing,			200	
Bridges, five farm bridges $250 each, 1 public road $800,			2,050	
				16,108

Section 5.

From Ferguson's mills to Pine creek—length 4 miles 280 perches.

Excavation loam	119,682	10	11,968	
Embankment at Pine creek	29,956	13	3,894	
Aqueduct do 300 feet in length,			7,550	
One 4 feet culvert,			275	
Grubbing,			500	
Bridges, 8 farm bridges $250 each, one public road $800,			2,800	
				26,987

Section 6.

From Pine creek to lower end of Jerseyshore—length 3 miles.

Excavation loam,	21,700 yds at	11	$2,387	
do cutting,	47,862	15	7,179	
do sandy loam	45,172	9	4,065	
1 lock 7 feet lift,			2,720	
1 four feet culvert,			275	
Grubbing,			200	
Bridges, 8 farm and private bridges $250 each, two public road $800,			3,600	
				20,426

Section 7.

From Jerseyshore to upper side of Larry's creek—length 1 mile 80 perches

Excavation slate, clay,	33,245 yds at	12	$3,987	
1 four feet culvert,			275	
Grubbing,			300	
Bridges, 2 farm bridges $250, one public road $800,			1,300	
				5,862

Section 8.

From Larry's creek to lower end of Bluff's—length 2 miles and 20 perches.

Embankment at creek,	84,342 yds at	15	$12,651	
Aqueduct,			3,425	
One lock 8 feet lift,			2,870	
Embankment at Bluffs, 1 mile, 210 perches,	161,942	20	32,388	
Wall at two inch batter, 1 mile 210 pr. 8 feet by 25,	pr. 69,960	$1 10	76,956	
Grubbing,			50	
				128,340

Section 9.

From the Bluffs to Hughes' farm—length 3 miles.

Excavation, cutting,	86,735 yds at	15	$13,010	
do loam,	40,936	10	4,093	
One culvert 10 feet chord,			850	
One do 4 feet do			275	
Grubbing,			100	
Bridges, 6 farm bridges $250 each,			1,500	
				19,828

Section 10.

From Hughes' farm to Stewart's place—length 1 mile 200 perches.

Excavation clay,	33,623 yds at	12	$4,034	
do cutting,	18,260	20	3,652	
Paving on sidling 130 perches in length,	pr. 4,803	$1	4,803	
One culvert 12 feet span,			1,200	
Two do 4 feet do,			550	
Grubbing,			50	
				14,289

Section 11.

From Stewart's to Newberry—length 3 miles 300 perches.

Excavation loam,	104,721 yds at	10	$10,472	
One 4 feet culvert,			275	
Grubbing,			600	
Bridges, 8 farm bridges $250 each, one public road $800,			2,800	
				14,147

Section 12.

From Newberry to Williamsport—length 3 miles.

Embankment at Lycoming creek,	71,091 yds at	15	$10,663	
Aqueduct do			7,300	
Excavation cutting,	71,793	11	7,897	
do loam,	42,348	10	4,234	
Two locks 8 feet lift, $2,870			5,740	
Two 4 feet culverts,			550	
Grubbing,			6 0	
Bridges, 5 farm bridges $250 each, 2 public road $800 each,			2,850	
				39,834

Section 13.

From Williamsport to Loyalsock creek—length 3 miles.

Excavation loam,	73,139 yds at	10	$7,313	
Embankment at Miller's saw-mill run,	16,426	12	1,971	
One 6 feet culvert,			350	
One 8 feet do			650	
Grubbing,			200	
Bridges, 4 farm bridges $250 each,			1,000	
				11,484

Section 14.

From Loyalsock to Hall's upper farm—length 4 miles.

One lock 6 feet lift,			$2,6600	
Dam in creek,			1,200	
Guard lock,			1,900	
Excavation clay,	17,355 yds at	11	1,909	
do do	95,452	10	9,545	
Embankment on island,	8,604	10	860	
do in the gut,	9,777	13	1,271	
One culvert 6 feet chord,			400	
Grubbing,			950	
Bridges, 4 farm bridges $250 each,			1,000	
				21,695

Section 15.

From Hall's upper farm to Kleckner's ferry—length 3 miles, 60 perches.

Excavartion, cutting,	39,526 yds at	12	$4,743	
do loam,	54,854	10	5,485	
Embankment,	26,595	13	3,457	
do	8,213	12	985	
One lock 8 feet lift			2,870	
One culvert 4 feet chord,			250	
One do 8 feet do			1,000	
Grubbing,			650	
Bridges, 5 farm bridges $250 each,			1,250	
				20 690

Section 16

From Kleckner's ferry to end of Muncy creek embankment—2 miles 80 perches

Excavation, deep cut	94,518 yards at	25 cts	23,629	
do do	28,355	23	6,521	
Embankment	46.896	15	7,034	
Excavation, clay	30,370	12	3,644	
One lock 7 feet lift			2,720	
Aqueduct at Muncy creek			2,650	
One lock 8 feet lift			2 870	
One culvert 6 feet chord			450	
Grubbing			600	
Bridges—2 farm bridges at $ 250 each			500	
				50,618

Section 17.

From Muncy creek embankment to Muncy hills—length 3 miles 200 perches.

Excavation, clay	99,790 yards at	11 cts	10,976	
do deep cut, slate and clay	126,134	25	31,533	
Three locks, 7 feet lift	at $ 2,720 each		8,160	
Grubbing			800	
Bridges—Three farm bridges, and 1 P. one public road at $ 800			1,550	
				53,019

Section 18.

Round the Muncy hills—length 1 mile 300 perches.

Towing path embankment 1 mile and 50 perches	110,227 yards at	25 cts	27,555	
Wall 2 inch batter 7 by 22 250 perches	27,949 perches	$1 10	30,744	
Embankment	250 pr. 53,776 yds at	20	10,755	
Dam at Sugar Camp island			10,290	
Guard lock			3,750	
Grubbing			300	
				83,394

Section 19.

From Muncy hills to Peter Fogleman's—length 2 miles 100 perches

Excavation, cutting	105,110 yards at	12	12,613	
Paving against sideling 35 perches in length	1,292 pr	$ 1	1,292	
Excavation, loam	28,258 yards	10 cts	2,825	
Grubbing			200	
Bridges 3 farm bridges at $250 each, 1 public road $800			1,550	
				18,480

Section 20.

From Fogleman's to Warrior Run—length 4 miles 280 perches.

Excavation, loam	90,344 yards at	10 cts	9,034	
do clay	36,666	12	4,399	
Embankment at culvert at Delaware Run	12,222	12	1,466	
One culvert 8 feet chord do			900	
Paving on sideling	731 pr.	80	584	
Grubbing			650	
Bridges—8 farm bridges at $250 each, 1 public road at $800			2,800	
				19,833

Section 21

From Warrior Run to Milton—length 4 miles 160 perches.

Embankment at Warrior Run	24,445 yds. at	12 cts	2,933	
1 Ten feet culvert			1,140	
1 Lock 6 feet lift			2,660	
Excavation clay	147,757	11	16,226	
1 6 feet culvert			400	
One culvert of 12 feet chord at Limestone run			1,500	
Grubbing			600	
Bridges—8 farm bridges at $250, 2 street bridges at $350 each, and 2 public road at $800			4,300	
				29,795

Section 22.

From Milton to Wilson's mill at Chilisquaque—length 5 miles 290 perches.

Excavation, loam	127,046 yards at	10 cts	12,704	
Embankment at creek	11,990	12	1,438	
Aqueduct at Chilisquaque creek			2,550	
Two locks 6 feet lift	$2660 each		5,320	
One 4 feet culvert			250	
Grubbing			1,250	
Bridges—8 farm bridges at $250 each, 1 public road at 800			2,800	
				26,312

Section 23.

From Wilson's mill to Northumberland—length 4 miles 240 perches.

Excavation, slate and clay	26,032 yards at	15 cts	3,904	
do sandy loam	106,384	10	10,638	
One lock 8 feet lift			2,870	
Grubbing			375	
Bridges—9 farm bridges at $250 each			2,250	
				20,037
Total distance 68 miles 85 perches.		Total		$723,311

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Grubbing			650	
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				26,312

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One lock 8 feet lift			2,870	
Grubbing			375	
Bridges—9 farm bridges at $ 250 each			2,250	
				20,037

Total distance 68 miles 85 perches. Total $ 723,311

A STATEMENT of contracts for the excavation of forty-six sections on the West Branch division of the Pennsylvania Canal.

No. of section.	Names of Contractors.	Date of contract.	EXCAVATION PER CUBIC YARD. Common	Hard	Hard-pan	Embankment	Puddling	Slate rock	Loose rock	Solid rock.	Per perch of 25 feet. Vertical wall	Outside slope wall	Trimming stone on outside wall	PER SQ. YARD. Inside stone wall	Grubbing.
		1828													
1	Cameron, Ritner & Co	Oct 11	10	14		20	20	30	40	50	40	45	50	25	At the estimate of the Engineer.
2	do do	Oct 11	10	14		18	18	30	40	50	40	40	45	25	do do
3	John & Samuel Shaffer	Nov 14	13		25	14	15		25	30					Estimate of Engineer,
4	Hunter & Donnelly	Nov 26	10			10									Estimate of Engineer,
5	Thomas & M'Clintock	Oct 23	12	14	20	16	16	17	45	50		1 00		20	$ 400,
6	Hopkins, Buckalew & Stephens	Nov 27	10	12	E	12½		40	40	70					Estimate of Engineer,
7	Beard, Hill, Perine & Beard	Oct 9	15¾	16	25			45							$ 275,
8	Welch, Perine & Co	Nov 28	10	est	25	12½									Estimate $20,
9	William H. Welch	Oct 7	9			9									
10	John Lewis	Oct 23	8	14	20	10	8	50	50	62½	37½	65	50	20	$ 20,
11	Michael Malone & Stephen Moore	Oct 24	7½	9	17	7½	7½	20	20	40				6	25,
12	Henry Colt	Oct 7	8	10	16	12	16	22	30	76					Estimate of Engineer,
13	Craft, Burrows & Co	Oct 10	7	9	12	18	20	40	37½	50	1 00	1 00	90	17	$ 300,
14	S. L. Seigfried & Co	Oct 23	8½	10	15	12½	16	40	37½	45					100,
15	Malone & O'Brien	Nov 28	7	9	14	12½	12½	20	20	40				6	250,
16	David & John Watson	Oct 9	10	10	12	20	25	20	25	45	50	1 20		15	Estimate of Engineer,
17	George M. Wasson	Nov 18	8	10	12	13½		37½	45	56					$ 20,
18	Hopkins, Backalew & Stephens	Oct 16	10	12	E	15		40	40	70					Estimate of Engineer,
19	Cande & Gridly	Oct 30	9			10			45	50				30	$ 350,
20	M'Cleery & Gudykonst	Oct 10	8	10	13	18	27	37	40	75				17	300,
21	William B. Sullivan	Oct 8	9	13	20	13	37	50	25	75				37½	175,
22	Armstrong, Montgomery & Co	Oct 11	9	13	19	20	25	30	28	50	70	60		20	15,
23	Bodine, Pollock & Co	Oct 15	9½	10	20	10		20	20	62½				30	20,
24	Jackson, Miles & Co	Oct 11	8½	13	18	12		20						12½	Estimate of Engineer,
25	Fulmer & Levan	Oct 8	8	13	20	16	37½	55	35						do do
26	Bright & Hougendobler	Oct 17	8	12	14	14	20	16	35	40					do do
27	Crawford & Carnahan	Oct 7	9	10	12	11½									do do
28	Samuel L. Seigfried	Oct 28	9		14	13	16	35		45		50			do do
29	Maan, Billmeyer & Crawford	Oct 10	9½	11	14	12½	12½	20	20	30	50	60	1 75	40	$ 100,
30	Quinn & Sheridan	Nov 13	9	9	25	10		30	25	50				18	225,
31	E. Bowman & Co	Nov 29	9	10	30	10		30	25	50					50,
32	James Smith	Nov 29	8½	12½	18	10		20	35	50					Estimate of Engineer,
33	Simon Dwyer	Oct 16	8	9	25	10		30	25	50					$ 4 0,
34	Lyman Kelay	Nov 20	10	Est.		12½	12½	20	25	37½					Estimate of Engineer,
35	Quinn, Sheridan & Farrell	Oct 13	9	9½	25	11½		30	25	50				18	$ 160,
36	Wasson & Norton	Nov 18	9		12½	12½		30	40	50					30,
37	John Thompson	Oct 15	10⅝			11½	12	30	35	60	1 00	62		66	Estimate of Engineer,
38	Samuel L. Seigfried	Nov 13	9		18	12	14	35		37		75			do do
39	Mudey, Cummings & Co	Oct 20	9	10	16	10	E	19	49	29	29	25	25	25	$ 19,
40	Mudey, Cummings & Co	Oct 20	9	10	16	10	E	19	49	29	29	25	25	25	48,
41	Harvold, Reinsnyder & Co	Oct 8	10	15	20	15	20	37½	37½	55	62½	62½	75	17	250,
42	William M'Gaughy	Nov 26	10	12½	25	14	45	40	40	55	62½	25	25	25	Estimate of Engineer,
43	Kemp & Hobart	Oct 11	9			12½	16								do do
44	Hepburn, Miles & Jackson	Oct 11	9	15	21	16	18	19	35	40				12½	do do
45	Wasson & Black	Nov 18	8	10	12	10		30	40	60					$ 15,
46	Jackson, Miles & Hepburn	Oct 11	9	15	21	14		18	35	42				12½	Estimate of Engineer.

ANDREW M'REYNOLDS, Superintendent.

Canal Office, Milton, November 20th, 1828.

B. A STATEMENT of the persons to whom, and the prices at which, the stone and wood work has been assigned on the West Branch division of the Pennsylvania Canal.

Dam at Sugar Comp island, Schuyler, Fletcher, Kinman & Co. contractors, the wood work of the frame complete, per foot lineal, $3 50;—filling in with stone per perch of 25 cubic feet, 45 cents;—for the stone work of abutments, per perch, $2;—filling on sheeting per cubic yard, 40 cents;—excavation for mud sills, per cubic, yard 18 cents;—cubbing, &c. at estimate of engineers;—iron work per cwt, $10.

Aqueduct over Chillisquaque creek, Moore and Mackey, contractors, trunk complete, per foot lineal, $10;—stone work per perch, $2 65.

Locks.	Names of contractors.	Wood work entire.	Stone pr p.	Iron per lb.	Excavation.		Embankment.		Puddling.	
No. 1,	Roush and Dillman,	$1050 00	$2 50	Estimate of engineer,	do	do	do	do	do	do
2	Roush and Dillman,	1050 00	2 70	do do	do	do	do	do	do	do
3	Field, Wilcox, Stoughton & Co.	1500 00	2 50		do	do	40 cents		25 cents	
4	do do do	1500 00	2 50	The iron is included	do	do	20		25	
5	do do do	1500 00	2 50	with the wood work.	do	do	20		25	
6	do do do	1500 00	2 50		do	do	20		25	
Guard at Muncy hill,	Cameron, Ritner & Cameron,	3500 complete			do	do	20			

Culverts, on sections 12 and 14, Roush and Dillman, contractors, Stone work per perch, $2 83¾, to be laid in lime mortar.
17, Henderson & Fisher, do do 2 62½ do do
25, 29, 30, 31, Kutz and Proctor, do do 2 50 do do Coping per foot lineal, 75 cents.
21, M'Cormick & Montgomery, do do 2 49½ do do

Public bridges, on sections 6, 12, 25, 32 and 36, Mudey and Clackner, contractors, stone work, $1 59½ per perch;—superstructure 2 45¼ per foot;—coping, 21½ cents per foot;—railing on walls, 50 cents per foot average—superstructure complete.

Farm bridges, on sections 6, 13, 14, 17, 23 and 33, Mudey and Clackner, contractors, stone work, $1 57½ per perch;—superstructure $1 71½ per foot.
do do 28, 29, 30, 31, 35, 37, 38, 39, 40, 41, 42, 43 and 45, Graham and Miller, con'rs, stone work $1 62½ per perch—gross sum $67 37 each.
do do 7, 9, 10, 16, 20, 21, 24 and 27, do do do 1 42½ do 62 50 each.

ANDREW M'REYNOLDS, *Superintendent.*

Canal Office, Milton, November 20, 1828.

A STATEMENT of contracts for anal.

No. of section.	Names of Contractors.	Date of contract	
		1828	
1	Cameron, Ritner & Co	Oct 1	ngineer.
2	do do	Oct 1	
3	John & Samuel Shaffer	Nov 1	
4	Hunter & Donnelly	Nov 2	
5	Thomas & M'Clintock	Oct 2	
6	Hopkins, Buckalow & Stephens	Nov 2	
	[illegible] & Reed	Oct 1	
2	Roush and Dillman,		do
3	Field, Wilcox, Stoughto		cents
4	do do		
5	do do		
6	do do		
Guard at Muncy hill,	Cameron, Ritner & Cam		

Culverts, on sections 12 and 14, Roush and
17, Henderson
25, 29, 30, 31, Kutz and B 5 cents.
21, M'Cormick

Public bridges, on sections 6. 12. 25. 32 and 36, pping, 21½
cents per foot;—railing on wal

Farm bridges, on sections 6. 13, 14, 17, 23 and 3
do do 28, 29, 30, 31, 35, 37, 37 each.
do do 7, 9, 10, 16, 20, 21, 24 2 50 each.

dent.

Canal Office, Milton, November 20, 1828.

No. 2.

Report of A. M'Reynolds, superintendent of the West Branch Division, with documents A. B. C. D. E. and F. annexed thereto.

To the Canal Commissioners of Pennsylvania,

The superintendent of the West Branch division of the Pennsylvania canal, respectfully submits the following report, viz:

That after having given thirty days notice in the public papers as the law requires, forty-six sections of the twenty-three miles, as directed to be located, the same having been divided into sections of about half a mile each, were put under contract on the first day of October last, (see statement hereunto annexed, marked A. exhibiting the names of the contractors and the prices at which each section is contracted for.) (See statement hereunto annexed, marked B. exhibiting the names of the contractors and the prices at which the dam at Sugar camp island, guard lock at Muncy hills, and locks No. 1, 2, 3, 4, 5 and 6, the aqueduct across Chillisquaque creek, the culverts on sections No. 12, 14, 17, 21, 25, 29, 30, and 31; and bridges on sections No. 6, 12, 25, 32, and 36 public; and farm bridges on sections 6, 13, 14, 17, 23, 33, 28, 29, 30, 31, 35, 37, 38, 39, 40, 41, 42, 43, 45, 7, 9, 10, 16, 20, 21, 24 and 27, is contracted for. All the contractors have commenced work, and it is confidently expected, that the excavation on the whole of the sections let will be in a good state of forwardness this fall. Statement marked C, showing the organization of the engineer corps while laying the explored line on the east and west side of the river from Northumberland to Bald Eagle. Statement marked D, showing the present organization of the engineer corps on said division. And statement marked E, showing the probable cost of the whole work on said twenty three miles to be done, as per statement marked B. and C. made by Francis W. Rawle, Esq. the engineer on the line.

All of which is respectfully submitted,

ANDREW M'REYNOLDS, *Supr.*

C.

List of persons employed in the engineer department on the West Branch Division Pennsylvania Canal, while laying the explored line on the east and west side of the river from Northumberland to Bald Eagle:

Francis W. Rawle, engineer, $ 2,000 per annum,	
William Rodrigue, assistant engineer, from April 26 to June 13, 49 days, at $ 2 75 per day,	$ 134 75
Robert Faries, assistant engineer, from April 25, to June 13, 50 days, at $ 2 75 per day.	137 50
William Wilson, surveyor, from April 24 to June 9, 47 days, at $ 3 per day,	141

Joseph M. Nesbit, target man, from April 28 to June 13, 47 days at $1 50 per day, 70 50

George Reifsnyder, target man, from April 30 to June 10, 42 days, at $ 1 50 per day, 63

William R. Shoemaker, assistant target man, from April 30 to June 13, 45 days, at $ 1 per day, 45

Paul Geddis, chain carrier, from April 28 to June 13, 47 days, at $ 1 per day, 47

Joseph Green, chain carrier, from April 28 to June 13, 47 days, at $ 1 per day, 47

William Strine, axeman, from April 28 to June 13, 47 days, at $ 1 per day, 47

Jacob Wheeland, axeman, from April 29 to June 10, 43 days, at $ 1 per day, 43

William M'Clintock, baggage wagon, from April 24 to June 7, 45 days, at $ 2 25 per day, 101 25

D.

List of persons now employed in the engineer department on the West Branch Division Pennsylvania Canal.

Francis W. Rawle, engineer, from May 1, at $ 2000 per annum.

William Rodrigue, assistant engineer, from June 14 to November 20, 160 days, at $ 2 75 per day, $ 440

Robert Faries, assistant engineer, from June 14 to Nov. 20, 160 days, at $2 75 per day, 440

Joseph M. Nesbit, target man, from June 14 to November 20, 160 days at $ 1 50 per day, 240

William R. Shoemaker, target man, from June 14 to November 20, 160 days, at $1 50 per day, 240

George S. Armstrong, assistant target man from September 3 to November 20, 79 days, at $ 1 50 per day, 118 50

Paul Geddis, assistant target man, from August 25 to November 20, 88 days at $ 1 per day, 88

William Strine, axeman, from August 25 to November 20, 88 days, at $ 1 per day, 88

John H. Parks, axeman, from August 25 to November 20, 88 days at $ 1 per day, 88

2,619 50

William Laird, clerk in canal office from September 25th to Nov. 20th, 57 days.

ANDREW M'REYNOLDS, *Super.*

West Branch canal office, Milton, Nov. 20, 1828.

E.

The following is an estimate of the probable cost of constructing that portion of the West Branch division of the Pennsylvania canal, now under contract, from Muncy Hills to Northumberland, 23 miles inlength, made from the contracted prices, by Francis W. Rawle, Esq. engineer on the line, viz:

Dam, guard lock and excavation, wall and embankment from Muncy Hills to section No. 8,	$75,361
Excavation and embankment from section No. 8 to the end of the division,	45,465
Locks including embankment,	20,000
Aqueducts and culverts,	11,888
Bridges	12,258
Waste-wiers	1,200
Grubbing	4,958
	171,130

ANDREW M'REYNOLDS,
Superintendent.

F.

Shewing the present organization of the engineer corps on the West Branch division of the Pennsylvania canal.

Engineer	Francis W. Rawle.
Assistant engineers	William Rodrigue,
	Robert Faries.
Target men	Joseph M. Nesbit,
	William R. Shoemaker.
Assistant	Paul Geddis,
	William Morris.
Axe men	William Steine,
	John H. Parks.

ANDREW M'REYNOLDS,
Superintendent.

WM. LAIRD, *Clerk.*

West Branch Canal Office,
Milton, November 20th, 1828.

Series 8.

DOCUMENTS RELATING TO SURVEYS.

No. 1.

Report and estimate in the survey of the Pennsylvania Rail-way, from Columbia to the Gap, by John Wilson, Engineer.

To the board of canal commisioners of the state of Pennsylvania.

GENTLEMEN,

Agreeably to instructions received from the secretary of the board in April last, I repaired to Columbia, in Lancaster county, for the purpose of locating the Pennsylvania rail way, and have now the honour of submitting the following report, with plans and estimates of the location and formation of twenty-nine miles of the road.

As the termination of the twenty-ninth mile, from the head of the inclined plane at Columbia, (see position A, on the accompanying map,) approaches near to the deep excavation, in the Gap of Mine ridge, and having in my last year's report, designated the summit at Henderson's as the point separating the eastern from the western divisions of the rail-way, I shall therefore, in the present report, confine myself solely to the leading facts connected with the western division, and the location of its route, as delineated on the accompanying map.

Preparatory to the commencement of the location of the railway, various examinations were made and experimental lines traced; and having considered it important to the line, that the inclined plane and steam power should be located near its place of beginning, it was found practicable to effect that object from the position marked C. (see map) near the east end of the Columbia bridge, and which may be designated as the place best suited for the termination of the Pennsylvania canal. But as the extension of the line through the town of Columbia, along the margin of the Susquehanna river, to a point (marked B) at the southern extremity of the town, offered a more favourable position, from whence the engine plane could be traced, I therefore commenced at that point the location of the plane, and determined its length to be about six hundred and sixty-yards, and height ninety feet.

As it was found impracticable at the commencement of the survey to trace the precise line on the margin of the river, on account of the accumulation of lumber and other matter then deposited on its bank, the estimate of the cost of levelling the plane, and this portion of the line, which will not be expensive, is deferred to another period.

Those inhabitants of Columbia, through whose property the line must pass, have by a written document, which was handed to the secretary of the board, released the state from any damages for buildings or land.

From the head of the plane the line is traced to the position north of Mount Pleasant village, and to that point on Little Conestoga creek, both referred to in my former report.

From thence through the north-east corner of Lancaster, it reaches Big Conestoga creek, east of Mrs. Hall's residence.

In locating the road in the neighbourhood of Lancaster application was made to me by a committee of citizens appointed by the select and common councils of the city, to trace the line marked E F, (see map,) which they deemed more advantageous to the interests of that community. It is obvious however, that on inspection of the map, this line would be injurious to the main route; and the excess of cost of levelling it to the graduation, is about three thousand dollars. A branch line could be constructed for this amount, which would be beneficial both to the main rail-way and Lancaster, by making the latter more accessible as a place of deposit.

There were three distinct lines traced to Big Conestoga creek; one on the north margin of Hardwick run, to the crossing place at Mrs. Hall's; a second on the south side of the same run to Demuth's mill, and a middle line leading across the run, which was finally considered as best adapted for the rail-way.

The line crossing at Demuth's, could not be united with any graduation within the assumed limit to Mill creek, it was therefore abandoned.

A line was traced for six miles from the east end of the contemplated bridge at Mill creek, pursuing a more northwardly direction than the explored line of last year; my object was to reach a position on Pequea creek near Eckert's mill, but the application of the different grades was found to render a location on this route very expensive, I therefore did not hesitate to withdraw the party and return to our position at Mill creek, from which we located a line as far as Weaver's farm on the old route, thence it crossed Brisbane's run, and Pequea creek, and was conducted to the position at Eshleman's dam, referred to in the preliminary report of last December. Continuing the location from the latter point, and following the northern margin of Eshleman's and London canal runs, the line enters at the eastern end of Williamstown, on the Philadelphia and Lancaster turnpike, and thence it is conducted to our former position at Aby's, from which to the side hill of the Mine ridge, the line is traced with a radius of moderate curvature. Continuing the graduation along the sloping ground of the ridge, the limit of the present estimate is determined at the picket 354, on the profile No. 29. to which I refer. From the latter point the location has been extended through the Gap of Mine ridge, and has advanced to that position beyond Cloud's mill dam, in the valley of Chester county, which terminated the second section in the eastern division of last year's report.

Reverting to the position at Aby's, from which we graduated a line last year, ascending east at 29$\frac{3}{4}$04 feet to the mill, it was found in the present survey, that in order to trace the line to Mine ridge, with a radius of easy curvature, the distance would be considerably diminished, I therefore increased the grade to 31 feet and located the road to the Gap, with a cut at its summit of 55 feet.

It is my intention however, without altering the present location, to diminish the grade of the 28th and 29th miles to the former number of 29.04; and this is easily effected, by commencing this rate of graduation about a mile further back on the line.

In concluding my remarks upon the location of this division of the Pennsylvania rail-road, I will observe that in directing the different explorations, with the view of selecting the proper line for the road, the diminution of distance, so as not to extend beyond the limit of a reasonable expense, was an object of primary consideration, and which was accomplished to a greater extent than expected.

The remark in one of the concluding clauses of last year's report, that embankments and cuttings were avoided, the expense of which might have been equivalent to the increased length of railway, has been verified by the present location; for the difference in distance is four miles and 33¾ chains. As regards the comparative expense, I shall take occasion to refer to that in the sequel of this report.

The flexures in the line of road, and which were unavoidable, are of moderate curvature. The radii of their curvatures vary from 631 to 1891 feet; in one instance only, and that is immediately at the end of the level platform on the engine plane at Columbia, the radius of curvature is about 350 feet, but this can be easily increased on the opening of the road, should it be deemed necessary.

There is another route which I shall now bring before the view of the board. It commences west from Captain Slaymaker's, at the position marked G on the map; and is traced after crossing London run, on its southern margin to the point H; it is then lifted to the side hill of Mine Ridge, by an inclined plane of about 75 feet; from this it is traced to the Gap, which will require a depression at its summit of only five feet; from the gap it has progressed in its extension along the south side hill of Mine Ridge, five miles, and is intended to be conducted (should the ground be favorable) to the Chester valley near Coatsville, by another plane and engine. The object of this investigation is to ascertain whether we cannot so shorten the distance between the Gap and Philadelphia, and so far diminish the expense of construction, that the interest arising upon the difference of expense between this route and the lower level located beyond Cloud's, may be an equivalent to that of maintaining and keeping in repair the two stationary engines.

The survey involving this question will be completed in the course of another week.

Applications have been made to me at various times during the present survey, to make examinations of routes, which were considered by those having an interest in them, as presenting more advantageous ground for the location of the Pennsylvania rail way, than the explored line reported upon last year. I have endeavored to give all the attention to them that time and the nature of my duties would permit.

The routes proposed by the citizens of Chester county, residing in Honeybrook township, were examined.

From the summit above Irwin's mill, on one of the head branches of Pequea creek, following the valley leading to West Brandywine at Beaver dam, thence to the summit dividing West Brandywine from Beaver creek, which is tributary to East Brandywine, the surface of the country indicates favorably for the location of a road; but the height of the ridge which divides the waters of Pequea and West Brandywine, cannot be overcome without the aid of machinery: neither can this summit be attained from Lancaster without rendering the line of graduation both circuitous and expensive. Another route was examined which leads from the summit near the Compass tavern; but the same difficulties presented themselves here as in the former.

The elevation of the summits between the Gap at Henderson's and the Welsh mountain, and to which my attention had been directed, vary from 186 to 230 feet above the position of the ridge through which we pass into Chester valley.

Such other routes as have been examined, and the discussion of which have a relation to the eastern division of the railway, I shall defer until a future period.

The drawings illustrative of the location now submitted, are 1st, a general map upon a scale of four miles to the inch, exhibiting the country through which the line is traced—2d, 29 sectional maps of a mile each, and upon a scale of 16 inches to a mile; also 29 profiles upon the same horizontal scale, but 40 feet vertical to an inch; these should have been attached to the sectional maps, but the latter were not finished in time—3d, 3 drawings, showing the elevations and plans of the bridges; the references upon which sufficiently explain their various parts.

GRADUATION TABLE.

Chains	Ascending rate per mile.	Descending rate per mile.
184.44	26.00	
15.46		6.50
50.52	23.	
105.08	27.50	
21.01	level	
47.87		27.50
45.		16.75
254.11		27.50
25.95	25.	
19.	20.	
11.50		20.
69.	25.	
39.		20.
118.15		27.50
22.59	level	
21.85	3.80	
187.	27.50	
29.		20.
8.		25.
4.	level	
9.		15.
3.		10.
11.		3.
6.		10.
10.	26.	
13.		20.
5.		10.
94.32		27.50
7.50	level	
162.	27.50	
18.	10.	
52.	level	
11.	20.	
25.		10.
15.	level	
75.90		27 50
16.42		18.
47.	27.50	
18.		14.
15.60	level	
*278.50	27.50	
*190 25	81.	
2320.00	29 miles.	

*Intended to be altered to 178.50—27.50 290 25—29.80

ESTIMATE.

Mile 1st, Passes over ground very favourable for the road. It will be chiefly levelled from the matter thrown out of the side ditches.

Excavation on 6.22 chains—mean depth 3.8 feet, 1715 cubic yards, at 7 cents per yard,	120 05
Embankment on 16.40 chains—mean depth 3½ feet, 2706 cubic yards at 10 cents	270 60
Filling at Pike 185 cubic yards at 7 cents	12 95
Excavation on 10 chains—mean depth 1.3 ft, 913 cubic yards at 7 cents	63 91
Double drain in 47.40 chains, 466 cubic yards at 6 cts	27 96
One under-drain at 18 dollars	18
	$513 47

Mile 2d, On gentle and sloping ground—the line crosses Forrey's meadow—at the 12th picket there is a narrow strip of woods. The grubbing is not estimated, as the value of the trees will be equivalent for this item, on every part of the line to the Gap of Mine ridge.

Excavation on 21.7 chains—average depth 3.1 feet 4643 cubic yards at 8 cents	371 44
Embankment on 20 chains—average depth 4.7 feet, 6366 cubic yards at 12 cents	763 92
Excavation on 8.38 chains—average depth 5.2 feet, 3335 cubic yards at 8 cents	266 80
Double drain on 27 chains—267 cubic yards at 6 cents	16 02
Two bridges of 12 feet in length at $162,40 and $76,40	238 80
	$1,656 98

Mile 3d, Is located in open fields, excavation easy, soil, loam and clay.

Excavation on 16.30 chains, average depth 3.9 feet, 4872 cubic yards at 8 cents	389 76
Excavation on 15.25 ch av dep 4.6 ft 5328 c yds at 8 cts	426 24
Embankment at Gerber's run on 7.75 chains, average dep. 55 feet, 2876 cubic yards at 12 cents	345 12
Embankment on 7.32 chains, 483 cubic yards at 7 cts	33 81
Cutting Sherrick's ridge 19.45 chains, average depth 4.1 feet, 5908 cubic yards at 8 cts	472 64
Double drain on .5 chains, 50 cubic yards at 6 cts	3 00
Bridge at Gerber's, 12 feet	222 40
	$1,892 97

Mile 4th, Passes over gentle side-way ground—crosses two meadows which must be bridged, and enters the cutting at the summit north of Mount Pleasant. Soil, loam, clay and clay slate.

Excavation on .38 ch, 110 cubic yards at 6 cents	6	60
Embankment at Musser's run 11 chains, average depth 5.9 feet, 4443 cubic yards at 12 cents	533	76
Excavation on 12 chs, av dep .9ft 772 cubic yards at 6 cts	46	32
Side cutting on 5 chains, 85 cubic yards at 6 cents	5	10
Embankment at Rohrer's run 11 chains average depth 4.2 feet, 2986 cubic yards 12 cents	358	32
Side cutting on 29.8 chs, 432 cubic yards at 6 cents	25	92
Excavation on 16. 60 chains, average depth 5.1 ft, (part of Mount Pleasant ridge) 6349 cubic yards at 10 cents	634	90
Two bridges of 16 and 12 feet $258,40 and 216 40	469	80
One under drain at $12	12	00
	$2,092	12

Mile 5th, Located on ground easy of excavation—between pickets No. 58 and 59 loose stones.

Excavation on 59 chains, average depth 12 feet, part of Mount Pleasant ridge, 42,920 cubic yards at 12 cents	5,150	40
Embankment at Wolf's run on 11.87 chains, average depth 2.8 feet, 2000 cubic yards at 10 cents	200	00
Excavation on 8.50 chs, av dep 3.2 ft 1954 c yds at 8 cts	156	32
Double drain on 10 chains, 98 cubic yards at 6 cents	5	88
Embankment at Harnishe's run 6 chains, average depth 2 feet, 724 cubic yards at 10 cents	72	40
Two bridges 12 feet, each $108 40	216	80
	$5,801	80

Mile 6th, Generally of easy formation—from pickets 68 to 72 estimated as common excavation, should stone occur it may remain to be quarried and broken for the Horse path.

Excavation on 4.50 ch av dep .5 ft, 180 c yds at 6 cts	10	80
Embankment on 9 ch av dep 1 ft, 492 c yards at 7 cts	84	44
Excavation on 15 ch av dep 2.5 ft 2700 cubic yds at 7 cts	189	00
Excavation at Heiss' on 23 chains, average depth 7.4 feet, 13,750 cubic yards at 10 cents	1375	00
Embankment on 9.50 ch av dep 2.1 ft 1172 c yds at 8 cts	93	76
Excavation on 6 ch av dep 1.8 ft 767 cubic yds at 7 cts	53	69
Embankment at Rigle's run 8 chains, average depth 3.6 feet, 1799 cubic yards at 11 cents	197	89
Bridge at Rigel's run 12 feet	114	40
One under drain	14	00
	$2,082	98

Mile 7th, Is located on gentle sloping ground.

Excavation on 18 ch, av dep 1.6 ft, 2022 cubic yds at 7	141	54
Embankment at Bear's run on 5 chains, average depth 4.8 feet, 1380 cubic yards at 12	165	60
Excavation on 16 chs av dep 1.7 ft, 1911 cubic yards at 7	133	77
Side cutting on 10 chains, 188 cubic yards at 6	11	28
Excavation on 10 chs, av dep 1.8 ft, 1304 cubic yards at 7	91	28
Embankment on 6.4 chains, average depth 1.3 feet, 543 cubic yards at 9	48	87
Excavation on 11 chains, average depth 3.4 feet, 2705 cubic yards at 8	216	48
Bridge at Bear's run 12 feet	129	40
One under drain	14	00
	$952	22

Mile 8th, On gentle slopes declining south the whole section, easy for road forming.

Embankment on 9 chains, average depth 4.4 feet, 2,592 cubic yards, at Lemon's run, at 11 cents.	285	12
Excavation on 7 chains, average depth 0.8 feet, 405 cubic yards at 7 cents	28	35
Embankment on 3 chains, average depth 0.4 feet, 74 cubic yards at 7 cents	5	18
Excavation 23.50 chains, average depth 3.2 feet, 5,370 cubic yards at 8 cents	429	60
Embankment on 3.25 chains, average depth 0.4 feet, 72 cubic yards at 7 cents	5	04
Excavation on 10.50 chains, average depth 2.8 feet 2,086 cubic yards at 7 cents	146	02
Embankment on 16.50, average depth 3.1 feet, 3,103 cubic yards at 10 cents	310	30
Bridge at Lemon's spring run 50 feet	310	12
One under drain	16	
	1,535	73

Mile 9th, On easy ground, the line passes south of the village of Hempfield, and then crosses the Marrietta turnpike. The section terminates on the east side of the Little Conestoga creek, which is passed with a truss bridge.

Excavation on 18.50 chains, average depth 3.7 feet, 4,930 cubic yaads at 8 cents	394	40
Embankment at Old Road, 86 cubic yards at 10 cents	8	60
Side cutting on 13 ch 254 cubic yards at 6 cents	15	24
Embankment on 17 ch, av dept 7 ft 675 c yds at 7 cents	47	25
Embankment at west end of Little Conestoga bridge on 10 chains, average depth 5.9, 3,987 cubic yards at 12 cts	478	44
Embankment at east end of do. on 1.78 chains, average depth 8.4, 1,107 cubic yards at 11 cents	121	77

Little Conestoga bridge 792 feet	14,500	
One under drain at old road	14	
		15,579 70

Mile 10th, Easily formed, some of the small embankments made from widening the side ditches.

Embankment on 1.44 chs av dep 3 2 ft 282 c yds at 10 cts		28 20
Excavation on 6.50 chs, av dept 3.3 ft 1,573 c yds at 8 cts		125 84
Side cutting on 12 chs, 226 cubic yards at 6 cents		13 56
Excavation on 7 chs, av dept 0.7 ft 38 c yards at 7 cents		22 80
Side cutting on 6 chs, 92 cub yards at 6 cents		5 52
Embankment on 11.50, av dept 1,348 cub yds at 10 cts		134 30
Excavation on 7 chs, av depth 1,266 cub yds at 7 cts		88 62
Embankment on 10 chs, av dept 2,505 cub yds at 12 cts		300 60
One culvert 3 feet	60	
One under drain	15	
		794 44

Mile 11th, Of the same character as the last.

Excavation on 4.80 chains, average depth 3.3 feet 731 cubic yards at 7 cents		54 67
Excavation on 6 chains, av depth 2.4 feet, 1,037 cubic yards at 7 cents		72 59
Embankment on 1,470 chains, average depth 2.7 feet, 2,436 cubic yards at 10 cents		243 60
Embankment on 15.50 chains average depth 2.1 feet, 1,908 cubic yards at 10 cents		190 80
Embankment on 14.90 chains, average depth 2.4 ft, 1,855 cubic yards at 10 cents		185 50
Excavation at Myers' summit on 15.13 chains, average depth 1.2 feet, 1,332 cubic yards at 7 cents		93 24
One culvert 8 feet	60	60 00
Two under drains at 15 dollars each	30	
		930 40

Mile 12th, Rock found at picket 207, which will be disposed of for the horse path—soil loam clay.

Excavation on 13.17 chs, average depth 1.8 feet, 1,663 cubic yards at 7 cents		117 81
Excavation on 11.50 chains, average depth 2.5 ft, 2,078 cubic yards at 7 cents		145 46
Embankment at Ross' run 9.40 chains, average depth 3.6 feet. 2,099 cubic yards, at 10 cents		209 90
Excavation on 21 chains, average depth 4.1 feet, 6,254 cubic yards at 8 cents		500 32
Excavation on 5 chs, av depth 1.5 ft, 547 c yds at 7 cts		38 29

Embankment on 3 chains, average depth 0.5 feet, 88 cubic yards at 7 cents	5	81
Excavation on 5 chains, average depth 1.8 feet 629 cubic yards at 7 cents	44	03
Embankment on 2.80 chains, average depth 2.2 feet, 362 cubic yards at 10 cents	36	20
Bridge at Ross' run, 12 feet	108	40
One under drain	12	
	1,218	22

Mile 13th. A portion of this section passes about a quarter of a mile north of the buildings in the city of Lancaster, crosses Hardwick run east of Mr. Colesman's house, and Big Conestoga at a bluff near Mrs. Hall's residence. Limestone rock bottom in creek.

Embankment at south end of Hardwick bridge on 7.50 chains, average depth 6 feet, 2,928 cb yards at 13 cts	380	64
Embankment at north end of do. 7.82 chains average depth 4.3 feet, 2,175 cubic yards at 13 cents	282	75
Excavation on 11.45 chains, average depth 0.5 feet, 507 cubic yards at 6 cents	35	42
Excavation on 11.80 chains, average depth 4 feet, 3,450 cubic yards at 8 cents	276	
Embankment at west end of Big Conestoga bridge on 5.60 chains, average depth 5.3 feet, 1,281 c yards at 10 cts	128	10
Embankment at east end of do. 8.69 chs, average depth 4.5 feet, 2,543 cubic yards at 13 cents	330	59
Hardwick bridge 244 feet	1,640	50
Big Conestoga bridge 1,400 feet	24,081	
	27,155	

Mile 14th. The excavations on this section are moderate and easy, soil generally loam and clay at picket 27; one foot of rock, which can remain; the smaller embankments on this, as in other sections, are made up from widening the side ditches.

Side cutting on 14 chains, 200 cubic yards at 6 cents	12	
Excavation on 19 ch av depth 2.1 ft 2839 c yds at 7 cts	198	73
Embankment on 7.75 ch av dept 2.6 ft 1195 c yds at 10 cts	119	50
Excavation on 20.25 ch av dept 4.4 ft 6670 c yds at 8 cts	533	60
do 10.60 ch av dept 2.6 ft 1980 c yds at 7 cts	138	60
Embankment on ch 3, av dept 0.5 ft 83 c yds at 7 cts	5	81
Two under drains at $15 and $12	27	
	1,035	24

Mile 15. Passes over gentle sloping ground, declining south; soil loam, clay, easily excavated.

Embankment on 13.76 ch, av depth 4.5 ft, 4011 c yds in Landis' Woods, at 12 cents	481	32
Excavation on 2.68 ch av dept 0.6 ft 121 c yds at 6 cts	7	26
Embankment on 4.50 ch av dept 0.8 ft 190 c yds at 7 cts	13	30
Excavation on 23.85 ch av dept 4.9 ft 8747 c yds at 9 cts	787	23
do on 9 ch av dept 1 ft, 671 c yds at 7 cts	46	97
Side cutting on 6 ch 65 c yds at 6 cts	3	90
Excavation on 8.33 ch av depth 5 feet 6973 cubic yards, part of Landis' at 10 cents	697	30
Culvert 3 feet at 860	60	
	2097	28

Mile 16*th*. The cutting at the commencement of this section was not sounded to the full depth; it is estimated as common excavation, and should rock however occur, it may remain for the formation of the horse path; the rest of the section is nearly on surface.

Excavation on 20.44 chains, av depth 8.9 feet, 15,204 cubic yards, part of Landis' ridge, at 12 cents,	1824	48
Embankment 5.50 ch, av depth 1.3 ft, 398 c yds at 8 cts	31	84
Side cutting on 24.50 ch 402 cubic yards at 6 cents	24	12
Embankment and excavation on 29.50 ch 633 c yds at 7 cts	44	31
One under drain	14	
	1938	75

Mile 17*th*. Road forming easy on this section; small embankments raised from earth obtained in widening side ditches.

Embankment on 10.50 ch av dept 0.7 ft 381 c yds at 7 cts	26	67
Excavation on 9.50 ch av depth 0.8 ft 588 c yds at 6 cts	35	28
do on 34.19 ch av depth 4.4 ft 11,041 c yards, at Musgrove road, at 9 cents	993	69
Excavation on 6 20 ch av depth 2.1 ft 24,000 c yds at 7 cts	168	
Embankment on 3.75 ch av dept 0.5 ft 104 c yds at 7 cts	7	28
One under drain	12	
	1242	92

Mile 18*th*. Crosses Mill creek at S. Gibbon's; the line passes between his house and barn, and beyond Mill creek a branch of it is crossed; the section generally is of easy formation; soil, loam, clay.

Embankment on 11.86 ch av depth 1.8 ft 1216 c yds at 8 cts	97	28
do at west end of Mill creek bridge, 10.50 chains, av depth 6.9 feet, 5155 cubic yards at 15 cents	773	25

Embankment at east end of bridge, on 3.90 chains, av depth 5.7 feet, 1516 cubic yards at 11 cents	166	76
Excavation on 16.50 ch av depth 1.6 ft 1922 c yds at 7 cts	134	54
Embankment at west end of Conard's bridge on 3 ch, av depth 5 feet, 1278 cubic yards at 12 cents	153	36
Embankment at east end of bridge on 6.75 chains, av depth 4 feet, 1694 cubic yards at 10 cents	169	40
Excavation on 15.75 chains, av depth 4.1 feet, 4472 cubic yards at 8 cents	357	76
Mill creek bridge 528 feet	9204	
Conard's bridge 122 feet	710	50
	11,766	85

Mile 19th. This section crosses the old Lancaster road, and in general, it is of easy formation; soil, clay, loam.

Excavation on 7.63 chains, av depth 1.6 feet, 853 cubic yards at 7 cents	59	71
Embankment on 3.66 chains, av depth 0.4 feet, 91 cubic yards at 7 cents	6	37
Excavation on 5.95 chains, av depth 0.8 feet, 342 cubic yards, at 6 cents	20	52
Embankment on 14.90 chains, av depth 1.2 feet, 996 cubic yards at 8 cents	79	68
Excavation on 2.50 chains, average depth 1.2 feet, 103 cubic yards at 6 cents	6	18
Embankment on 7.50 chs, 123 cubic yards at 7 cents	8	61
Excavation on 15 chs, av depth 3.7 ft, 4079 c yds at 8 cts	326	32
Embankment on 7.70 chains, av depth 3.3 feet, 1582 cubic yards, at 11 cents	174	02
Excavation on 11.90 chains, av depth 5.3 feet, 4739 cubic yards at 9 cents	426	51
One culvert 3 feet	60	
Under drain	13	
	1,180	92

Mile 20th. Passes over gentle sloping ground, declining towards Stauffer's run; soil, loam clay.

Excavation on 14.79 chs, av depth 5.9 ft, 6763 c yds at 9 cts	608	67
Embankment on 8.42 chs, av dept 3.5 ft, 1836 c yds at 10 cts	183	60
Excavation on 7.06 chs, av dept 3.4 ft, 1740 c yds at 8 cts	139	20
Embankment on 10.60 chains, av depth 4.7 feet, 3297 cubic yards at 11 cents	362	67
Excavation on 11.50 chains, av depth 3.0 feet, 2445 cubic yards at 8 cents	195	60
Embankment on 5 chs, av depth 0.6 ft, 167 c yds at 7 cts	11	69
Excavation on 4.50 chs, av depth 0.7 ft, 229 c yds at 6 cts	13	74
Embankment on 7 chs, av depth 2.2 ft, 890 c yds at 10 cts	89	

Excavation on 1.71 chs, av depth 0.4 ft, 57 c yds at 6 cts	3	42
Two culverts of 8 feet	120	
One under drain	15	
	1,742	59

Mile 21st, The greater part of this section is located on uneven ground, it crosses Soudersbury valley at Weaver's. The cutting is easy, soil, loam, clay.

Excavation on 2.23 chains, average depth 1.6 feet, 251 cubic yards at 7 cents	17	57
Embankment on 10 chains, average depth 1.7 feet, 957 cubic yards at 10 cents	95	70
Excavation on 4.50 chs, av dep 1 ft, 318 c yars at 6 cts	19	08
Embankment on 9 50 chs, average dept 4.2 ft, 3,671 cubic yards at Porter's run, at 12 cents	440	52
Excavation on 9.72 chs, average dept 5.1 ft, 5,770 cubic yards at 8 cents	301	60
Embankment at west end of Soudersburg valley, bridge on 6.30 chs, average dep 5.7 ft, 2,449 c yards at 12 cts	293	88
Embankment at east end of bridge on 5.10 chs, average depth 5.5 ft, 1,891 c yards at 12 cents	226	92
Excavation on 430 chs, average depth 5.3 ft, 1,029 cubic yards at 8 cents	82	32
Embankment on 9.40 chs, average depth 3.2 ft, 1,889 cubic yards at 10 cents	183	90
Bridge at Porter's 16 feet	114	37
Bridge at Soudersburg valley 500 feet	2,127	
One culvert 8 feet	60	
	3,967	86

Mile 22d, At the commencement of this section, a ridge of easy excavation is pierced, after which the ground falls slightly below the graded line, it crosses Brisbane's run and leaves an embankment between the bridge at that run, and Pequa creek.

Excavation on 27 chains, average depth 11.4 ft, 27,650 c yards at Weaver's summit, at 12 cents	3,318	
Embankment on 10 chains, average depth 1.7 ft, 1,012 cubic yards at 10 cents	101	20
Embankment on 9.50 chs, average depth 1.2 ft, 636 cubic yards at 7 cents	44	52
Excavation on 10 chains, average depth 1.8 ft, 1,307 cubic yards at 7 cents	91	89
Embankment at west end of Brisban's run, bridge on 5.15 chains, average depth 5.6 ft, 1,942 cubic yds at 11 cts	213	62
Embankment at east end of Brisban's and west end of Pequea bridges on 5.60 chains, average depth 7.9 feet, 3,552 cubic yards at 12 cents	379	80

Bridge at Brisban's run 442 feet	$ 1,926	
Pequea bridge 600 feet	5,318	
		11,392 63

Mile 23d, Passes over an undulating surface encountering ledges of lime stone which afford excellent building stone, which will be wanted in the bridges and on the road. The excavation is only estimated as common cutting. This section crosses the Lancaster and Philadelphia turnpike and terminates at a bluff at the head of Eshleman's dam.

Embankment at east end of Pequea bridge on 472 chains, average deptht 6.9 ft, 2,296 cubic yards at 13 cents	298 48	
Embankment on 9.50 chains, average depth 1.7 ft, 969 cubic yards at 10 cents	96 90	
Embankment on 4.30 chains, average depth 1.7 ft, 433 cubic yards at 10 cents	43 30	
Excavation on 13.70 chains average depth 4.8 ft, 4,970 cubic yards at 8 cents	397 60	
Embankment on 7.50 chains, average depth 1 ft, 422 cubic yards at 8 cents	33 76	
Excavation on 8 chains, average depth 3 ft, 1,749 cubic yards at 8 cents	139 93	
Embankment on 5.42 chs, average depth 3.2 ft, 1,059 cubic yards at 10 cents	105 90	
Excavation on 9 chains, average depth 0.3 feet, 231 cubic yards at 6 cents	13 86	
Embankment on 1.40 chs, av dep 5.9 ft, 563 cb yards at west end of Eshleman's bridge at 12 cents	67 56	
Two culverts of 3 and 4 feet at 70 and 60 dollars	130	
Two under drains at 14 and 15 dollars	29	
		1,356 28

Mile 24th, Is located on undulating ground—the cuttings are easy. The section after it passes between Mrs. M'Ilvaine's house and barn, terminates in the orchard.

Embankment at east end of Eshleman's bridge on 5.34 chains, average depth 9 ft, 2,227 c yards at 12 cents	267 24	
Embankment on 8.50 chains, average depth 4.4 ft, 2,277 cubic yards at 11 cents	250 47	
Excavation on 1.90 chains, average depth 4.8 ft, 714 cubic yards at 8 cents	57 12	
Embankment on 7.68 chains average depth 4.2 ft, 2,052 cubic yards at 10 cents	205 20	
Excavation on 3 chains, average depth 1.5 ft, 320 cubic yards at 7 cents	22 40	
Embankment on 6.90 chains, average depth 5.6 ft, 2,623 cubic yards at 10 cents	262 30	

Excavation on 19.50 chains, average depth 8.6 ft, 13,991 cubic yards at 9 cents	1,259	19
Embankment at M'Ilvaine's run on 8.96 chains av depth 6 ft, 37.01 cubic yards at 11 cents	407	11
Bridge at Eshleman's mill pond, 419 feet	2,085	75
Bridge at Eshleman's run, 132 feet	1,029	50
One culvert 3 feet	60	
Two under drains at 17 and 18 dollars	35	
	5,941	28

Mile 25th, Is traced on sloping ground, declining to London run, less uneven on the surface than the last section, light loam, liable to wash.

Embankment on 6.88 chains av depth 2.1 feet 853 cubic yards at 10 cents	85	30
Excavation on 9.50 chains av depth 2.7 feet 1863 cubic yards at 7 cents	130	41
Embankment on 9 47 chains av depth 1.6 feet 897 cubic yards at 8 cents	71	76
Excavation on 7.50 chains av depth 3.4 feet 1825 cubic yards at 8 cents	146	00
Embankment on 7.05 chains av depth 5.8 feet 3032 cubic yards at captain John Slaymaker's at 10 cents	303	20
Excavation on 6.35 chains av depth 4 feet 1841 cubic yards at 8 cents	147	28
Embankment on 3.68 chains av depth 3.6 feet 1980 cubic yards at 10 cents	198	00
Excavation on 10 ch's av depth 3.3 ft 2348 cu yds at 8 cts	187	84
Bridge at captain Slaymakers 16 feet	377	00
One under drain	14	00
One culvert 3 feet	60	00
	1,720	79

Mile 26th, Continues along the slopes of London run, crosses a branch which leads from Williamstown, at Pickets 276 limestone rock, which will be used for abutments of the bridge. The line crosses the Lancaster and Philadelphia turnpike twice. This section is located on favorable ground.

Excavation on 10.21 chains, av depth 0.5 feet 392 cubic yards at 6 cents	23	52
Embankment at west end of Williamstown bridge on 3.60 chains av depth 5.8 feet, 1405 cubic yards at 12 cents	168	72
Embankment at east end of bridge on 2.60 chains average depth 5.9 feet, 1056 cubic yards at 12 cents	126	72
Excavation on 8.20 chains average depth 3.6 feet, 2122 cubic yards at 8 cents	169	76
Side cutting on 15 chains, 271 cubic yards at 6 cents	16	26
Embankment on 7 chains, av depth 0.9 feet, 357 cubic yards at 7 cents	24	99

Excavation on 17.20 chains av depth 2.2 feet, 2710 cubic yards at 7 cents	189 70
Embankment on five chains av depth 2.2 feet 640 cubic yards at 10 cents	64 00
Williamstown bridge 409 feet,	2376 00
Two under drains 2 feet each, $12 and $14	26 00
	3185 67

Mile 27th, The surface on this section is rather uneven, the cuttings are considered easy, soil, loam and clay slights.

Excavation on 7.25 chains av depth 1.4 feet, 776 cubic yards at 7 cents	54 32
Embankment on 10.88 chains av depth, 6.7 feet, 5147 cubic yards at 12 cents	617 64
Excavation on 4 chains av depth 6.5 feet, 2053 cubic yards at 8 cents	164 24
Embankment on 10 50 chains av depth 3.3 feet, 2178 cubic yards at 10 cents	217 80
Excavation on 12.50 chains av depth 7.7 feet, 7818 cubic yards at 9 cents	703 62
Embankment on 7.54 chains av depth 2.5 feet, 1115 cubic yards 10 cents	111 50
Excavation on 2 chains, 147 cubic yards at 6 cents	8 82
Embankment on 13.29 chains av depth 2.4 feet, 1879 cubic yards at 12 cents	225 48
One culvert 8 feet	60 00
Two under drains $18 and $16	34 00
	$2,197 42

Mile 28th, This section is rough, with considerable embankment at Picket 323, it leaves Abeys lane, and crosses his meadow and Strasburg road to the side hill of the Mine ridge, soil, loam, clay and gravel.

Embankment on 18.30 chains av depth 10.9 feet, 16055 cubic yards at 15 cents	2,408 25
Excavation on 2.30 chains av depth 7 feet, 1280 cubic yards at 8 cents	102 40
Embankment on 8.44 chains av depth 5.6 feet 3161 cubic yards at 10 cents	316 10
Excavation on 6.05 chains av depth 2.4 feet, 1054 cubic yards at 7 cents	73 78
Embankment on 7 chains av depth 0.6 feet 234 cubic yards at 7 cents	16 38
Embankment at Eby's run on 9.55 chains av depth 9.2 ft 6742 cubic yards at west end of bridge at 12 cents	809 04
Embankment at east end of bridge on 3.22 chains av depth 7.3 feet, 1676 cubic yards at 10 cents	167 60
Excavation on 5,60 chains av. depth 7.6 feet, 3467 cubic yards at 9 cents	312 03

Embankment on 4.75 chains av depth 0.5 feet, 118 cubic yards at 7 cents	8 26
Excavation at Strasburg road, on 4 chains av depth 3.3 ft. 960 cubic yards at 8 cents	76 80
Bridge at Eby's run 115 feet	592 50
Two under drains $28 and $15	43 00
	4926 14

Mile 29th, Is traced on the side hill of the Mine ridge—the line recrosses the Strasburg road, the side slopes vary from 3° to 9° are principally wooded, soil, easy of excavation.

Embankment on 4.35 ch, av dep 2.2 ft, 554 c yds at 9 cts	49 86
Excavation on 5.22 ch, av dep 3 ft, 1122 c yds at 8 cts	89 76
Side embankment on 240 ch, 215 cubic yards at 8 cts	17 20
Excavation on 8.12 ch, average depth 3.9 feet, 2346 cubic yards at 8 cents	187 68
Embankment on 7.3 ch, av dep 4.1 ft, 1893 c yds at 10 cts	189 30
Excavation on 8.82 ch, av dep 2.9 ft, 1862 c yds at 8 cts	148 96
Embankment on 3. ch, av dep .7 ft, 118 c yds at 8 cts	9 44
do at run on 3.9 ch, av dep 4.7 ft, 1183 c yds at 10 cts	118 30
Excavation on 8.52 ch, av dep 3.3 ft, 2021 c yds at 8 cts	161 68
Side cutting on 4 ch, 102 c yds at 6	6 12
Excavation on 16 ch, av dep 2.6 ft, 2988 c yds at 7 cts	209 16
One culvert	60 00
One under drain $12	12 00
Bridge at run 12 feet	192 40
	$1,451 86

SUMMARY.

Mile first,	513 47
" second,	1,656 90
" third,	1,892 97
" fourth,	2,092 12
" fifth,	5,801 80
" sixth,	2,082 98
" seventh,	952 22
" eighth,	1,535 73
" ninth,	15,579 70
" tenth,	794 41
" eleventh,	930 40
" twelfth,	1,218 22
" thirteenth,	37,155 00
" fourteenth,	1,035 24
" fifteenth,	2,097 28
" sixteenth,	1,938 75
" seventeenth,	1,242 92
" eighteenth,	11,766 85
" nineteenth,	1,180 92

" twentieth,	1,742 59
" twenty-first,	3,967 85
" twenty-second,	11,392 63
" twenty-third,	1,356 28
" twenty-fourth,	5,941 28
" twenty-fifth,	1,720 79
" twenty-sixth,	3,185 67
" twenty-seventh,	2,197 42
" twenty-eighth,	4.926 14
" twenty-ninth,	1,451 86
	$119,350 51
For superintendance, &c.	11,935 05
Total amount,	$131,285 56

In comparing the estimate of last year with the one now submitted, the cost per mile of road forming is greater in the latter than the former, but the shortening of the distance between Columbia and the Gap, makes a material difference in the cost of the other contingent parts of the rail-way.

The excess of this item in the old estimate, is $41,505 $\frac{36}{100}$; to which add the road forming $81,049 $\frac{13}{100}$, and the amount is $122,554 $\frac{49}{100}$, giving the excess $3,204 $\frac{49}{100}$, a sum probably sufficient to complete that portion of the line between the engine plane and canal basin at Columbia, not included in this estimate.

In refering to the maps, it will be perceived that the profile of the whole line has been minutely ascertained.

All which is respectfully submitted,

JOHN WILSON, *Engineer.*

Sadsbury township, Lancaster county,
August 15, 1828.

No. 2.

Report and estimate on the continuation of the Pennsylvania Rail-way from the Gap to Philadelphia, by John Wilson, Engineer.

To the board of Canal Commissioners of the State of Pennsylvania

GENTLEMEN:

Having reported in August last, in conformity with your instructions, upon the location of that portion of the Pennsylvania rail road, between the Mine Ridge and Susquehanna river, and having designated it as the western division, I have now the honor to lay before the board, a continuation of the same, in relation to

the location of the eastern division of that road, accompanied with various plans and drawings illustrative of the operation, to which I shall refer.

Having brought to the view of the board the subject of an experimental line then in progress, (which had for its object the establishment of two inclined planes; one to attain the elevation of the ground at the Gap of Mine Ridge without a deep cutting, and the other to descend into the Chester valley, in the neighborhood of Coatsville, and there form a connexion with the explored line of last year;) the surveys and investigations involving the question of comparative expense and facility of transportation, between this route and the one formerly reported upon, were soon completed. The difference of distance between the latter and the route of the present location, is of little account, and the difference of expense would not compensate for maintaining and keeping in repair the steam engines.

I now proceed to describe briefly the route of the rail way location, commencing at the termination of the 29th mile from Columbia. A reference to the general plan No. 2, will assist in explaining the course of the line.

The graduated line enters the ground at the Gap of Mine Ridge, a few chains from its place of beginning: its greatest depth from the apex of the ridge is $55\frac{9}{10}$ feet, and the length of excavation is 42 chains. From different borings made on this section, there is nothing to apprehend from rock. The slopes on each side of the ridge will afford the advantage of using temporary railways as a means for the removal of the earth; and their application in the various cuttings and embankments upon the line, will have the effect of reducing the expense of road formation.

From the termination of the Gap excavation to Moore's mill, the line is traced over the same ground described in former reports. It crosses the branch of Octorara from which the mill derives its supply of water, very favorably for a bridge; and after winding along the slopes of the steep side hill of that creek, it enters the great valley of Chester, near the woollen factory of ——— Noble, Esq. hence it is traced on the southern side of North Valley hill to the eastern branch of Octorora creek, which the line crosses below Cloud's mill dam. Continuing on the same side of the valley hill, and passing through the lands of Messrs. Watkins, M'Gray, Philips, Boyd and others, it attains a summit in Smith's field, (being the dividing ridge between the waters of Susquehanna and Delaware rivers,) beyond the Cochraneville road; and thence crosses over to the northern side slope of the south valley hill, from whence it is traced on very favorable ground, intersecting in its course Buck run below the mill of James Truman, and the West Chester road, and finally attains the summit ridge dividing Buck run and Little Brandywine, beyond the residence of G. Isreal, Esq.

At the position where Buck run is crossed, it was thought expedient to make the attempt to leave Chester valley, by following the

valley of that water course. A line was accordingly traced along the margin of its southern bank for two miles, which passed over rugged and uneven ground, and was finally abandoned. Were it practicable to have located the route of a rail way following the source of Buck run, and keeping a direction south of West Chester, towards the Schuylkill and Philadelphia, it would have afforded great advantages to an important manufacturing country; but the circuitous nature of the line, (rendered so from the great irregularities and unevenness of thes urface,) and the expense of construction, caused me to desist from making any further examinations in this section of country.

Returning to the summit near Gen. Israel's which is intended to be depressed 33 feet. the rail-way line inclines northwardly towards the North Valley hill, crosses on the dividing ridge, the Wilmington road, and passes west of —— Hope's dwelling house; thence eastwardly on gentle sloping ground of the Valley hill, and is traced without varying much from that direction until it crosses West Brandywine, a few chains north of Coatesville; whence it proceeds to the ridge separating the waters of the West from the East Brandywine. designated in my former report as "Gardiner's summit."

While the locating party were advancing with their line of demarcation, and after the exploring party had completed all the requisite examinations to Gardiner's ridge, the latter were directed to explore a new line from that summit proceeding towards Downingtown, on the south side of the valley, and to endeavor after passing over west Brandywine to reach the south valley side hill, with such a level as would enable them at a maximum rate of graduation, to cross the bridge through any of the chasms which might offer the least expense in constructing the rail way.

The first experimental line was graded to the Brandywine, to a position north of Downingstown, and which offered a favorable place for crossing that water course. In extending this line eastwardly however, it was found to be unfavorable for our purpose.

Upon examining the ground to the south of where the Lancaster turnpike passes Brandywine, another position favorable for crossing presented itself; and having transferred our former level to it, we commenced tracing a line to the summit ridge at Baldwin's, which offered no impediment to the construction of a rail way; (see position B, on map,) and from whence after crossing the valley creek, south of Baldwin's mill, the graduation was extending along the slope of the south valley hill. and finally terminated at the "pass" marked C, (see map,) which is nearly opposite to the 21 mile stone from Philadelphia on the Lancaster turnpike.

The result of these various examinations were not completed until the location, (which was steadily advancing upon the old route,) had reached a position east from the white horse summit.

As the explorations made last year from this summit, with a view to find (by the nearest and most elegible route to Philadel-

phia) a position, from which, we could leave Chester valley, were very unsatisfactory, and having fully ascertained the practicability of locating a favourable line for the rail-way, upon the south side of the valley from Coatesville, to the point (C.) already noticed, I therefore did not hesitate to discontinue the location upon the old route, and to direct a minute and accurate location of the new.

While this was in progress, a position marked D. (on map) was assumed (in Thomas' field, between the Turnpike and Boot road,) in extension of the graded line from the pass C. and from which we proceeded with the location of the rail-way eastward, in a direction towards the Green tree tavern; and keeping upon the ridge dividing the waters of the valley and Crum creeks, and crossing the Lancaster turnpike, it inclines more northerly on the same ridge and recrosses the turnpike at Paoli tavern: from thence it proceeds eastwardly and again crosses the turnpike in front of the general Jackson tavern; it then runs nearly parallel with that road for a mile further, and passes to the south side of the same at Mrs. Robison's; thence through lands of Vanleer, Porter and Carter, it enters the ground in I Reese's field, leaving his barn to the left, and passing under the turnpike, follows by an easy curve, the most favourable ground to the rear of the Spring tavern; from whence it takes a more eastwardly direction, in order to avoid the high ridge near the Lamb tavern, which it leaves to the left. It is then traced through lands of Taylor, Weatherby, Kennedy and Mrs. Henderson, and passes to the northern side of the turnpike, proceeding to the summit in Mrs. Grove's field, which lies north of the Spread eagle tavern.—Leaving the latter summit the surface of which is below the line of rail way, the road is located on lands of Edward Siter and John Pusey, thence passing thro' Mrs. Abram's orchard, it proceeds towards the residence of Benjamin Mould, which it leaves to the right; and after crossing the ravine east of his house, it is traced on gentle sloping ground through lands of Richard Kimber, Lemuel George, and A. Lewis, thence crossing the road which leads to the Gulph Mills, the rail-way is continued without much deviation from the explored line of last year, to the summit in Rudolph's field, which is about 19 feet above the bed of the road.

Proceeding in a southwardly course from Rudolph's through the property of Messrs. Curwin and Thomas, it approaches the turnpike, and after crossing it near the toll gate, about nine miles from Philadelphia, it still keeps its southwardly direction, leaving the Union tavern (Balm's) to the left, and bending northwardly re-crosses the turnpike about half a mile east of the Buck tavern; from whence it runs nearly in a direction with the old Lancaster road, on the ridge dividing the waters of Cobb's creek and Schuylkill river, leaving that road at the seven mile stone, which is the position at which the surveys and estimates of last year terminated.

Thence the line is traced across the flat rock bridge road and bending eastwardly through the lands of Mr. George, passes near

Hoffman's house and keeps its eastwardly direction to the lane leading to Mr. George's house; thence through his fields passing north of his barn, it proceeds to the position E. on the general plan, north of the residence of the late judge Peter's; thence descending by an inclined plane of about 180 feet, crosses at a favourable place the Schuylkill river, and enters the bed of the old Union canal.

Following the bed of that canal to a position east of the Bush Hill establishment, it curves southwardly, and enters Broad street at its intersection with Callowhill street, proceeding down the centre of the former, it crosses Vine street and terminates conformably to the law within the limits of Philadelphia.

The located distance between the head of the inclined plane in Columbia, and the south side of Vine street in Philadelphia, is 82 miles and 8 tenths; and by the explored line of last year which terminated at the seven mile stone on the old Lancaster road, the distance from the Susquehanna to that point, including bridges was 85 miles and 66 hundreds; add to the latter the extension to Vine street, and it makes a difference between it, and the actual location of 8 miles and 95 hundreds.

It is 79½ miles from our place of beginning on the Susquehanna to Schuylkill river, and the distance between the two inclined planes is 78 miles and 88 hundreds.

Various examinations and experimental lines were traced southerly between the position at Benjamin Maul's and the seven mile stone, on the old Lancaster road. These were undertaken with a view to find a more favourable route by which we could approach the Schuylkill, than the one now located; but in every instance that an attempt was made to leave the ridge dividing the waters of the Schuylkill and Delaware rivers, the country became either exceedingly broken and intersected by ravines, or, its surface depressed too rapidly for our graduations. From some of the positions, and with the aid of two inclined planes and stationary steam engines, the level portion of country lying south of the present location, might be passed over, and a different direction given to the course of the rail-way; but it was considered more advantageous even with a reasonable increase of distance, to limit the application of steam power to the two points upon the line already noticed in this report.

The different horizontal curvatures on the eastern division, vary in their radii from 541 to 1891 feet; the curves which were traced by the smaller radius were but seldom adopted; and in the final opening and grading of the road, many of these, may be considerably improved, without much additional increase to the cost of road formation.

In referring to those sections on the maps where the brace of the rail-way exhibits a serpentine character, we do not increase the distance thereby, so much as might be expected.

It is assumed that the whole distance between Broad street in Philadelphia and Columbia, on the Susquehanna river by the rail-way is only encreased ($\frac{1}{10}$) one tenth part beyond the nearest and

most direct public roads between those places. Some sections of considerable extent do not vary much from the travelled road, but the mean increase for every ten miles is about one mile.

To elucidate this by an example, I will observe, that from our level picket No. 159 (see map) which is nearly opposite to the twelve (12) mile stone, on the Lancaster turnpike (which is thirteen miles from Broad street;) the distance from thence, following the serpentine course of the rail-way to the intersection of the line at Callowhill and Broad streets is 14 miles and 24 chains; the difference between the two being precisely in proportion to the excess already stated; the whole of the comparitive increase occurs between the picket already referred to, and the seven (7) mile stone on the old Lancaster road, for, from the latter position to Broad street our located distance is rather shorter than the extent of that road to the same street.

Such further information as may be deemed necessary to be laid before the board for their satisfaction, will be communicated after the estimate, which is now submitted.

Estimate of eastern division of Pennsylvania rail-way, commencing at western end of cut at Gap (in Mine ridge) and terminating at intersection of Broad and Vine streets, Philadelphia.

Mile 30th, The beginning of this mile pierces the Mine ridge at Gap depth, at apex 35 $\frac{9}{10}$ feet—from soundings taken, the cutting will be clear of rock, after leaving the cut it passes over good ground, crossing a small stream and ends near R. Moore's dwelling.

Excavation on 2.71 ch, dep 1.2 ft, 89 cubic yards at 7 cts	6	23
Cutting at Gap on 41.90 chains, average depth 20.7 feet, 97508 cubic yards at 17 cents	16,576	36
Embankment on 7.70 ch, dep 1.1 ft, 235 c yards at 8 cts	18	80
Excavation on 12 ch, dep 3.1 ft, 1783 c yards at 8 cts	142	64
Embankment on 8½ ch, av dep 3.7 ft, 1977 c yds at 11 cts	207	47
Excavation on 1½ ch, av dep 5.4 ft. 617 c yds at 7 cts	43	19
One bridge 12 feet	177	56
Under drain	12	00
	$17,184	25

Mile 31st, Passes over undulating ground consisting of short cuttings of easy excavation and embankments; soil, loam and clay. Crosses and re-crosses Newport turnpike.

Excavation on 18¾ ch, av dep 7.2 ft, 10510 c yds at 9 cts	945	90
Embankment on 19.50 ch, av dep 8.3 ft, 12046 c y 12 cts	1,445	52
Excavation on 10 ch, av dep 7.8 ft, 6300 c yds at 8 cts	504	00
Embankment on 8¼ ch, av dep 3.7 ft. 2003 c yds at 10 cts	200	30
Excavation on 3 ch av dep 8.5 ft, 2118 c yds at 7 cts	148	26
Embankment on 5.90 ch, av dep 5.5 ft, 2173 c y at 10 cts	217	30
Excavation on 1.20 ch, av dep 8 ft, 786 c yds at 7 cts	55	02

Embankment on 2¼ ch, av dep 3.1 ft, 437 c yds at 10 cts	43 70
Two culverts of 6 and 3 feet	240 00
Two under drains at $18 and 15	33 00
	$3,833 00

Mile 32d, Is traced over undulating ground of easy excavation, and terminates on south side of Moore's mill-dam, which is crossed by a balustrade bridge.

Embankment on 5¼ ch, av dep 2.3 ft, 719 c yds at 10 cts	71 90
Excavation on 5 ch, av dep 2¼ ft, 799 c yds at 7 cts	55 93
Embankment on 17½ ch, av dep 3.6 ft, 4001 c y at 11 cts	440 11
Excavation on 12 ch, av dep 7.1 ft, 6854 c yds at 8 cts	548 32
Embankment on 4.55 ch, av dep 6.2 ft, 1954 c y at 10 cts	195 40
Excavation on 9.20 ch, av dep 2.8 ft, 1822 c yds at 7 cts	127 54
Embankment on 5 ch, av dep 1.6 ft, 456 c yds at 9 cts	41 04
do at west end of Moore's mill on 4½ chains, average depth 3.6 feet, 1024 cubic yards at 11 cts	112 64
Bridge at Moore's 472 feet	2,615 93
Three culverts of 3.4 and 3 feet,	200 00
	$4,408 81

Mile 33d, Is located along a rough side hill, encountering ledges of rock and loose stone.

Embankment at south end of Moore's bridge on 4.11 chains, average depth 5 feet, 1360 cubic yds at 10 cts	136 00
Excavation on 13.20 ch av dep 15.6 ft, 20410 c y at 11 cts	2,245 10
Embankment on 12.65 chains, average depth 4.9 feet, 4081 cubic yards at 11 cents	448 91
Excavation on 6.65 ch, av dep 7.8 ft, 4243 c yds at 8 cts	339 44
Embankment on 4½ ch, av dep 2 ft, 535 c yds at 9 cts	48 15
Excavation on 10 ch, av dep 6.10 ft, 503 c yds at 6 cts	30 18
do on 8 ch, av dep 5.1 ft, 3073 c yds at 8 cts	245 84
Embankment on 9.70 ch, av dep 3.8 ft, 2357 c y at 10 cts	235 70
One under drain	18 00
	$3,747 32

Mile 34th, The first part of this mile passes over smooth sloping ground, then crosses Octorara creek with a considerable excavation on each side, and turning a point of North valley ridge, enters the Great valley of Chester county.

Excavation on 4.30 ch, av dep 3.2 ft, 997 c yds at 7 cts	69 79
do on 21 ch, 946 cubic yards at 6 cents	56 76
Embankment on 3½ ch, depth 1.1 ft, 107 c yds at 8 cts	8 56
Excavation on 11.20 ch, av dep 12.7 ft, 13229 c y at 9 cts	1,190 61
Embankment on 2.20 ch, at both ends of Cloud's bridge, 1018 cubic yards at 10 cents	101 18
Excavation on 4.34 ch, av dep 19 ft, 8891 c yds at 9 cts	800 19

Embankment on 5¼ ch, av dep 3.8 ft, 841 c yds at 10 cts	84	19
Excavation on 4 ch, av dep 6.5 ft, 2050 c yds at 7 cts	143	50
Side embankment on 11.11 ch, 717 c yds at 9 cts	64	53
Bridge at Cloud's 452 ft,	2,605	36
One under drain	17	00
	$5,139	20

Mile 35th. Is traced along the gentle side hill of North valley ridge. Soil, clay and sand stone.

Embankment on 3.39 ch, av dep 9.10 ft, 169 c yds at 7 cts	11	83
Excavation on 11 ch, av dep 1.5 ft. 1195 c yds at 7 cts	83	65
Embankment on 6¼ ch, av dep 2.2 ft. 858 c yds at 9 cts	77	22
Excavation on 5.40 ch, av dep 3.6 ft, 1424 c yds at 7 cts	99	68
do on 7.60 ch, 115 cubic yards at 6 cents	6	90
Excavation and embankment on 10 ch, 402 c yds at 7 cts	28	14
Embankment on 4¼ ch, av dep 3.4 ft. 948 c yds at 10 cts	94	80
Excavation on 16 ch, av dep 1.4 ft, 1634 c yds at 7 cts	114	38
Embankment on 8.5 ch, av dep 2.5 ft, 1254 c y at 10 cts	125	40
Excavation on 1 ch, av dep 3.8 ft, 274 c yds at 7 cts	19	18
Two culverts of 3 and 4 feet	200	00
One under drain	18	00
	$878	68

Mile 36th, Passes over slightly undulating side hill until it reaches Forree's ridge, then crosses the Valley on the west side of a ridge, dividing the waters of Delaware and Susquehanna rivers, (Smith's ridge.) Soil, clay and loam.

Excavation on 4.40 ch, av dep 3.8 ft, 1203 c yds at 7 cts	84	21
Embankment on 9 ch, av dep 8 8 ft, 2165 c yds at 10 cts	216	50
Excavation on 9.5 ch, av dep 9.10 ft, 637 c yds at 6 cts	38	22
Embankment on 10.5 ch, av dep 3.5 ft, 2300 c y at 10 cts	230	00
Excavation on 205 ch, av dep 7.3 ft, 11954 c y at 8 cts	956	32
Embankment on 22.11 ch, av dep 3.4 ft, 4593 c y at 11 cts	505	23
Two culverts of 3 feet, and one under drain	138	00
	$2,168	48

Mile 37th. At the commencement of this mile, the line pierces Smith's ridge, soil easy of excavation; it then proceeds to the South Valley hill, along which it is traced on gentle sloping ground, and ends on east side of ravine, which is crossed by a balustrade bridge.

Excavation at Smith's Ridge on 31.40 chains, av depth 9 6 feet, 25860 cubic yards, at 9 cents	2,327	40
Side excavation on 25 chains, 862 c yds, at 6 cts	51	72
Excavation on 12¾ chains, av depth 4.1 feet, 3841 cubic yards at 8 cents	307	28

Embankment at both ends of bridge on 3.37 chains, 1356 cubic yards at 10 cents	135 60
Bridge over ravine 289 feet	1,948 78
	4,770 78

Mile 38*th*. Is traced along a gentle sloping side hill, and ends on east side of a ravine, passed with a balustrade bridge; soil, micaceous, slate.

Excavation on 8.20 chs, av depth 4.5 ft, 2746 c y at 8 cts	219 68
do on 46 chs, 2082 c yards at 6 cents	124 92
do on 14½ chs, av depth 3.1 ft, 3278 c y at 8 cts	262 24
Embankment at east and west end of bridge on 2.70 ch, 1085 cubic yards at 10 cents	108 50
Excavation on 60 links, av depth 7.8 ft, 382 c yds at 7 cts	26 74
Bridge 303 feet	2,019 82
	2,761 90

Mile 39*th*, Is located on a rough side hill, and passes Buck run with a truss bridge, where it leaves the valley, then crossing West Chester road, pierces Buck run and Brandywine summit 33 feet; this cutting was imperfectly sounded, but has the appearance of containing lime stone.

Excavation on 10.39 chains, av depth 9.4 ft, 8356 cubic yards at 8 cents	668 48
Embankment at east and west end of Buck run bridge, on 2.09 chains, 1136 cubic yards at 10 cents	113 60
Excavation on 9.85 chs, av depth 15.4 feet, 15,071 cubic yards at 8 cents	1,205 68
Excavation on 16.30 chs, and filling at West Chester road, 2542 cubic yards at 7 cents	177 94
Cutting at Buck run and Brandywine summit on 30.61 chains, greatest depth 33 ft, av depth 18½ ft, 60,413 cubic yards, at 13 cents	7,853 69
Bridge over Buck run 472 feet	11,898 56
Culvert 3 feet	60 00
	21,977 95

Mile 40*th*, Re-crosses the Great Valley along the east side of Buck run summit, and gains the south side of the Northern Valley hill, after which it is traced upon favorable ground; soil, loam and loose stones.

Embankment on 9.09 chains, av depth 4.4 ft, 2605 cubic yards at 10 cts	260 50
Excavation on 2 chains, average depth 8.6 feet, 1433 cubic yards, at 7 cents	100 31
Embankment on 9.60 chains, av depth 4.3 ft, 2681 cubic yards, at 11 cents	294 91
Excavation on 12½ chs, av depth 3 ft, 2658 c yds at 7 cts	186 06
do on 12 chs, av depth 3.5 ft, 3064 c yds at 8 cts	245 12
Embankment on 9 chs, av depth 2.3 ft, 1246 c y at 10 cts	124 60

Excavation on 8¼ chs, av depth 3 ft, 1860 c yds at 7 cts	130 20
Embankment on 3.11 chs, av depth 2.6 ft, 481 c y at 10 cts	48 10
Two culverts of 3 and 4 feet	140 00
	1,529 80

Mile 41st. The line is located along side hill of North Ridge, over undulating ground; soil, same as last.

Embankment on 7.89 chains, av depth 5.5 feet, 2909 c yards at 10 cts	290 90
Excavation on 9½ chs, av depth 5 ft, 3551 c y at 8 cts	284 08
Embankment on 6 chs, av depth 9.10 ft, 309 c y at 8 cts	24 72
Excavation on 23½ chs, av depth 3.4 ft, 5752 c y at 8 cts	460 16
Embankment on 12½ chs, av depth 3 3 ft, 2546 c y at 10 cts	254 60
Excavation on 8 chs, av depth 8.4 ft, 5583 c y at 8 cts	446 64
Embankment on 3.61 chs, av depth 4.6 ft, 1082 c y at 10 cts	108 20
Two culverts of 4 feet	160 00
	2,029 30

Mile 42d. Commences at Fistler's still house, and is traced on favorable sloping ground to Rock run, which it passes with a balustrade bridge, after which the ground is undulating, crosses Philadelphia and Lancaster pike; soil, loam.

Embankment on 7.89 chs, av depth 9.2 feet, 5503 c y at 12 cts	660 36
do on 5¼ chs, av depth 2.1 ft, 683 c y at 10 cts	68 30
Excavation on 19½ chs, av depth 3.6 ft, 5094 c y at 8 cts	407 52
Embankment at west end of bridge at Rock run on 5.40 chs, depth 13 feet, 3142 c yards at 12 cents	377 04
do at east end of do on 0.30 chs, 102 c y at 9 cts	9 18
Excavation on 17.34 chs, av depth 8.7 ft, 12,588 c yards at 9 cents	1,132 47
Embankment on 4.20 chs, av depth 2.3 ft, 577 c y at 10 cts	57 70
Excavation on 2 36 chs, av depth 3 8 ft, 654 c y at 7 cts	45 78
Embankment on 4 36 chains, av depth 6.2 feet, 1848 c y at 10 cents	184 80
Excavation on 1.21 chs, av depth 5 9 ft, 797 c y at 8 cts	63 76
One bridge of 152 ft at Rook run	1,252 90
Two culverts of 5 and 3 feet	180 00
	4,439 81

Mile 43d Crosses Little Brandywine with a truss bridge 69 feet in height, and is then located on easy sloping ground, passing north of Coatsville; soil, loam.

Excavation on 1.42 chs, av depth 2.9 ft, 293 c y at 7 cts	20 51
Side embankment on 2 90 chs, 189 c y at 9 cts	17 01
Excavation on 8.12 chs, av depth 7 4 ft, 4818 c y at 9 cts	433 62

Embankment at east and west ends of Little Brandywine bridge, 312 c y at 10 cents	31 20
Excavation on 6.78 chs, av depth 14 6 ft, 9656 c y at 8 cts	772 48
Embankment on 5.40 chs, av depth 3.3 ft, 1089 c y at 10 cts	108 90
Excavation and embankment on 38.5 chs, 2996 c yards at 7 cents	209 72
Little Brandywine bridge 847 feet	29,508 74
One culvert 4 ft, and 1 under drain	95 00
	31,197 18

Mile 44th, Is traced on very favorable ground, crossing the Great Valley, and ends on east side of Gardiner's Ridge; soil, loam.

Excavation and embankment on 35,06 chs, 2256 c yards at 7 cts	157 92
Embankment on 7 chs, av depth 3.8 ft, 1678 c y at 11 cts	184 58
Excavation on 11 chs, av depth 2 ft, 1599 c y at 7 cts	111 93
Embankment on 10 chs, av depth 2.5 ft, 1478 c y at 10 cts	147 80
Excavation on 13.47 chs, av depth 3 ft, 2872 c y at 8 cts	229 76
Two culverts of 5 and 4 feet	200 00
	1,031 99

Mile 45th. Located on gentle sloping ground, crossing Philadelphia and Lancaster pike. Soil same as above.

Excavation and embankment on 80 ch, 5,700 c yards at 7 cents	399
One under drain	15
	414

Mile 46th, Is traced along south side of Philadelphia and Lancaster pike, on good ground. Crosses a small run with a culvert Soil same as last.

Excavation and embankment 69·53 chs, 3,470 c yards at 7 cents.	242 90
Excavation on 10.47 chs, av dep 4.2 ft, 3,202 c yards at 8 cents	256 16
One culvert 3 feet	60
	559 06

Mile 47th. Located on similar ground to the last—crosses two small runs.

Excavation and embankment on 80 chs, 6,529 cubic yards at 7 cents	457 03
Two culverts of 4 feet	160
	617 03

Mile 48th. This section near commencement passes through Gallagher's ridge at Gallagher-ville, (lime stone at 5 feet below surface.) then is traced for a few chains on favorable ground, after which it pierces a ridge of solid limestone, depth 7.3 feet, and ends near a small run.

Embankment on 9 chs. av dep 8.10 ft. 466 c yds at 8 cts	32	48
Excavation at Gallagher's on 15.80 chs, av dep 8.1 feet 10,575 cubic yards at 9 cents	951	75
Excavation on 9.40. x section, 189 cu yds at 6 cents	11	22
do on 15.30 chs, av dep 3.9 ft, 4,592 c yds at 8 cts	351	36
do on 12 chs, double drain, 117 c yds at 6 cents	7	02
do on 13 chs, av dep 2.8 ft, 2,632 c yds at 7 cents	184	24
Embankment on 5.47 chs, av dep 2.6 ft, 866 c yds at 10 cts	86	60
	1,124	67

Mile 49th Is located generally on very good ground, piercing a small ridge $7\frac{3}{16}$ feet, (rock at $2\frac{1}{2}$ ft.) until it reaches J. Hunt's ridge, which it passes 22 feet under—ends near centre of B. Wine bridge—crosses Philadelphia and Lancaster turnpike.

Embankment on 2.53 chs, av dep 3.4 ft, 532 c yds at 10 cts	53	20
Excavation on 10 chs. av dep .8 ft, 608 c yds at 6 cts	36	48
Embankment on 7 chs, av dep 1 ft, 378 c yds at 8 cts	30	24
Excavation on 6 chs, av dep 4 8 ft 2,159 c yards at 8 cts	171	12
Embankment on $7\frac{1}{2}$ chs, av dep 3 ft, 1,384 c yds at 10 cts	138	40
Excavation on 11 chs, av dep .9 ft. 724 c yds at 6 cts	44	52
do on 20 chs, av dep 8 ft. 13 074 c yds at 13 cts	1,699	62
Embankment on 4.70 chs, av depth 1.6 feet, 429 cubic yards at 10 cents	42	90
Bridge over the Big Brandywine 1,413 ft	14,684	22
One culvert 4 feet	80	
	16,980	70

Mile 50th Passes Big Brandywine with a bridge partly truss and partly balustrade, after which it crosses a hollow requiring another bridge. Then is traced on favorable sloping ground.

Embankment on $1\frac{1}{2}$ chs, dep 11.5 ft, at east end of Brandywine bridge, 476 c yards at 12 cents	57	12
Embankment at east and west end of bridge over ravine on 7.27 chs, depth 12 ft, 3,456 c yards at 14 cts	483	84
Excavation on 8 chs, x sec. 1.5 sq 178 c yds at 6 cts	10	68
do on 14 chs, dep 3.9 ft, 1,979 c yds at 8 cts	158	32
Embankment on 20 chs, av dep 2.1 ft, 2,506 c yards at 10 cents	250	60
Excavation on 3.37 chs, x sec. 1 2 sq. 60 c yards at 6 cts	3	60
Bridge over ravine 363 ft	2,194	24
	3,158	10

Mile 51st. Is traced at commencement on favorable ground, then enters Baldwin's ridge 26 feet under (limestone rock at 14 feet) terminates at end of point of solid rock which is pierced at 16.6 feet in depth, both affording good building stone.

Excavation and embankment on 2,893 chs, 910 c yards at 7 cents	63	70
Excavation at Baldwin's summit on 30.20 chains, average depth 14.3 feet, 41,770 c yards at 13 cents	5,430	10
Embankment on 10.07 chs, av dep 3.2 ft, 2,018 c yards at 10 cents	201	80
Excavation on 8.93 chs, average depth 6.3 feet, 4,370 c yards at 10 cents	437	
Culvert 3 feet	60	
	6,192	60

Mile 52d. This section crosses Boot road, with a small truss bridge, then passes Valley creek with a considerable excavation on west side, afterwards the ground is more favorable, but in general rough; soil slate and gravel.

Embankment on 7.20 chains, average depth 6.5 ft, 8,263 yards at 11 cents	358	93
Excavation on 10.73 chains av depth 11.4 feet, 10,950 c yards at 9 cents	985	50
Embankment at east and west ends of bridge over Valley creek on 2.04 chains, 812 c yards at 10 cents	81	20
Excavation on 1.42 chs, av depth 4 feet, 586 c yards at 7 cents	41	02
Embankment on 3.16 chs, average depth 4.9 feet, 1,017 cubic yards at 10 cents	101	70
Excavation on 5 chains, av dep 3.3 ft, 1,204 c yds at 7 cts	84	
do on 18 chains, x sec. 31 sq yds, 65 c yds at 9 cts	38	10
Embankment on 3 chs, dep 1 9 ft, 162 c yds at 8 cents	12	96
Excavation on 10.93 chs, av depth 4.5 ft, 3,695 c yards at 8 cents	295	60
Bridge over Valley creek 567 feet	13,719	41
Two bridges of 64 and 32 feet at $888 and 456	1,344	
	17,062	42

Mile 53d, Is located along the sloping side hill of South Valley ridge, passing in its course several considerable ravines.

Embankment at east and west ends of bridge ⋈ ravine on 5,86 chs, 2,452 cubic yards at 10 cents	245	20
Excavation on 12.80 chs, av dep 2.9 feet, 2,649 c yds at 8 cents	211	92
Embankment at east and west ends of bridge on 8.90 chs, 3,610 c yards at 10 cents	361	
Excavation on 7.75 chs, av dep 3.3 feet, 1,872 c yards at 8 cents	149	

Embankment on 6 chs, dep 2 ft, 342 c yds at 9 cents	30 78
Excavation on 14 chs, av dep 1.4 ft, 1,442 c yds at 7 cts	100 94
Embankment on 7.2½ chs, av dep 8.1 ft, 4,280 c yds at 12 cents	513 60
Bridge over ravine 620 feet	3,802
do over ravine 290 feet	1,941 60
do over Boot road 32 feet	749 22
	8,106 02

Mile 54th passes over a gentle sloping side hill, crosses one small ravine.

Embankment on 3.23 chains, average depth 8.3 feet, 2001 cubic yards at 12 cents	240 12
Excavation on 9.90 ch, av dept 2.6 ft, 1827 c yds at 7 cts	127 89
do and embankment on 47.30 chains, 2422 cubic yards at 7 cents	169 54
Embankment on 10.41 ch, av dep 7.5 ft 5624 c y at 11 cts	618 64
Excavation on 5.77 ch, av dep 3.1 ft, 1286 c yds at 8 cts	102 88
Bridge 16 feet	388 71
	1,647 78

Mile 55th pierces at commencement a ridge 18ft at apex; then is traced on gentle side hill, and terminates at eastern abutment of bridge over ravine.

Excavation on 15.73 ch, av dep 12.9 ft, 18956 cubic yards at 11 cents	2085 16
Embankment on 12 ch, av dep 2 ft, 1424 c yds at 9 cts	128 16
Excavation on 28.30 ch, av dep 3¼ ft, 7262 c yds at 8 cts	580 96
do on 5.90 ch, av dep 3 ft, 1266 c yds at 7 cts	88 62
Embankment on 5.44 chs at west end of bridge over ravine 2933 cubic yards at 10 cents	293 30
Bridge 590 feet	3,685 27
	6,801 47

Mile 56th. This section passes over in general very undulating ground, piercing at end a ridge 18 feet in depth, 5½ feet clear of rock.

Embankment at east end of bridge on 8.75 chains, 3299 cubic yards at 12 cents	395 88
Excavation on 8 ch, depth 1.9 ft, 340 c yds at 7 cts	23 80
do on 6.60 ch, av dep 6.7 ft, 3478 c yds at 8 cts	278 24
Embankment on 7.40 ch, av dep 1.8 ft, 794 c yds at 9cts	71 46
do on 9.20 ch, av dep. 3.9 ft, 2251 c yds at 10 cts	225 10
Excavation on 9 ch, av dep 1.5 ft, 979 c yds at 7 cts	68 53
Embankment on 7.40 ch, dep 1.6 ft, 334 c yds at 9 cts	30 06
Excavation on 19.37 ch, av dep 10.8 ft, 18,564 c y at 11 cts	2,042 04
Culvert 4 feet and under drain	95 00
	3,230 11

Mile 57th crosses the dividing ridge of the waters of Schuylkill and Brandywine, south of steam boat tavern, ground in general rough. Passes main branch of East Valley creek.

Embankment on 22.29 chains, average depth 8.1 feet, 13,328 cubic yards at 12 cents	1,599	36
Excavation on 8.5 ch, av dep 6 ft, 8939 c yds at 8 cts	315	12
Embankment at east and west end of bridge, on 10.19 chains, 4,256 cubic yards at 11 cents	464	75
Excavation on 8 ch ⋈ section 1.7 yards square, 167 cubic yards at 6 cents	11	22
do on 19.77 ch, av dep 4 ft, 5728 c yds at 8 cts	458	24
Bridge 32 feet	725	60
do over run 413 feet	2,691	54
	6,265	83

Mile 58th is traced along a gentle side hill, crosses two ravines with culverts; the line generally passes over good ground—soil micaceous slate.

Excavation and embankment on 1370 chains, 899 cubic yards at 7 cents	62	93
Embankment on 17 ch, av dep 4.2 ft, 4617 c yds at 11 cts	507	87
Excavation on 11 ch, av dep 2.4 ft, 1911 c yds at 7 cts	133	77
Embankment on 8.5 ch, av dep 3 ft, 4195 c yds at 12 cts	503	40
do on 6.5 ch, av dep 2.5 ft, 984 c yds at 10 cts	98	40
Excavation on 18.5 ch, av dep 5.8 ft, 8291 c yds at 9 cts	746	19
Embankment on .77 ch, av dep 2.7 ft, 125 c yds at 9 cts	11	25
Two culverts 4 and 5 feet	210	00
	2,273	81

Mile 59th. This section is traced on a very rough side hill, passing four ravines, with two truss and two balustrade bridges—ends near centre of the fourth—soil same as above.

Embankment at east and west ends of bridge on 2.48 chains 1220 cubic yds at 10 cents	122	00
Excavation on 5.45 ch, av dep 5.6 ft. 2321 c yds at 8 cts	185	68
do on 11 ch, av dep 3.7 ft, 2929 c yds at 8 cts	234	32
Embankment at east and west ends of bridge on 3.90 ch, 1561 cubic yards at 10 cents	156	10
Excavation on 9¾ ch, av dep 3.3 ft, 2310 c yds at 8 cts	184	80
Embankment on 4.03 ch, av dep 2.3 ft, 263 c yds at 9 cts	23	67
Excavation on 7.20 ch, av dep 4.5 ft, 2418 c yds at 8 cts	193	44
Embankment on 1.65ch, av dep 5.9 ft, 670 c yds at 10 cts	67	00
Excavation on 12 ch, av dep 5.5 ft, 5983 c yds at 8 cts	478	64
Embankment at west end of bridge on 1.80 chains. 356 cubic yards at 10 cts	35	60
Four bridges of 400, 131, 224 and 360 feet at $ 10,990 50 2,235 78, 5,816 23 and 12,687 68	30,730	19
	32,411	44

Mile 60th commences in a ravine. where the line leaves the valley and passes over very rough ground, piercing in its course two ridges, twenty-four and twenty feet in depth—soil micaceous slate, affording good material for the horse path.

Embankment at east end of bridge on 1.75 chains, depth 14 feet, 750 cubic yards at 10 cents	75 00
Excavation on 13 ch, av dep 14.7 ft, 18,752 c y at 12 cts	2,250 24
do on 6.33 ch, av dep 2.3 ft, 1028 c yds at 7 cts	71 96
Embankment on 7.50 ch, av dep 5 ft, 2500 c yds at 10 cts	250 00
Excavation on 1.20 ch, dep 2.9 ft 188 c yds at 6 cts	11 28
Embankment at east and west end of bridge on 9.26 ch, 2511 cubic yards at 10 cents	251 10
Excavation on 7.5 chains, av dep 14.8 ft, 10,905 c yards at 11 cents	1,199 55
Embankment on 4.75 ch, av dep 3.5 ft, 1030 c yds at 10	103 00
Excavation on 4.25 ch. av dep 2 4 ft, 724 c yds at 7 cts	50 68
Embankment on 6.16 ch, av dep 7 ft, 3061 c yds at 10 cts	306 10
Bridge of 203 ft	1,796 00
Two culverts of 3 and 4 ft and one under drain	155 00
	6,519 91

Mile 61st. This section is traced along summit of Valley Ridge on favourable ground, crosses one small ravine near Dempsey's. The line passes between Green Tree tavern and barn—ends on north edge of Philadelphia and Lancaster pike.

Excavation on 88 links, av dep 3.3 ft, 209 c yds at 7 cts	14 63
Embankment on 5.55 chs, depth 7.8 ft, 1,439 cubic yards at 11 cents	158 29
Embankment on 1.55 chains, av depth 1.4 feet, 122 cubic yards at 10 cents	12 20
Excavation on 13.12 chains, av depth 2.6 feet 2382 cubic yard at 8 cents	190 56
Embankment on 9 chains, depth 3.7 feet, 996 cubic yds at 10 cents	99 60
Double drain on 17 chains 166 cubic yards at 6 cents	9 96
Embankment on 5 chs, depth 2.6 ft, 377 c. y. at 10 cents	37 70
Excavation on 7 chs, depth 3.8 ft, 963 cubic yds at 7 cts	67 41
Embankment on 3 chs, depth 2.8 ft, 66 cub yds at 9 cts	5 94
Excavation on 13¼ chs, depth 1.5 feet, 1392 cubic yards at 9 cents	97 44
One under drain	15 00
	8 708 73

Mile 62d. Is located on ground slightly undulating of easy excavation, passes between Paoli tavern and barn, ends on the west side of Darby road, south of turnpike.

Excavation and embankment on 13¼ chains, 851 cubic yards at 7 cents	59 57

Excavation on 10½ chains, av depth 3.3 feet, 2485 cubic yards at 8 cents	198 80
Embankment on 6½ chains, av depth 4.7 feet, 2002 cubic yards at 11 cents	220 22
Excavation on 9 chs, av depth 5.3 feet, 3619 cubic yards at 8 cents	289 52
Embankment on 9½ chains av depth 6.7 feet 4448 cubic yards at 11 cents	489 28
Excavation on 4,90 chains depth 3.½ feet, 621 cubic yds at 7 cents	43 47
Embankment on 9½ chains av depth 3.1 feet, 1811 cubic yards at 10 cents	181 1
Excavation on 11.35 chains av depth 4·2 feet, 3486 cubic yards at 8 cents	278 88
One culvert 4 feet	80 00
Two under drains	28 00
	$ 1,868 84

Mile 63*d*. Passes between general Jackson tavern and barn, thence in front of Bear inn, after which it continues along north edge of pike about three-fourths of a mile, ends near Mrs. Robinson's inn; soil loam and clay.

Excavation on 8.35 chains av depth 4·1 feet, 2548 cubic yards at 8 cents	203 84
Do. on 6·65 chains, av depth 2·8 feet, 382 cubic yards at 7 cents	26 74
Embankment on 18·65 chs, av depth 4·3 feet, 5215 cubic yards at 12 cents	625 80
Excavation on 46·35 chs, av depth 7,10 feet, 2415 cubic yards at 7 cents	169 05
One under drain	14 00
	$ 1,039 43

Mile 64*th*. Crosses the turnpike near its commencement at the 17th mile stone, then turning a projecting point of ridge is traced over favourable ground, terminating in garden of A. Potter, south of Reesville, soil as above.

Excavation on 11·35 chains av depth 2·2 feet 1794 cubic yards at 7 cents	125 58
Excavation and embankment on 14 chains 649 cubic yds at 7 cents	45 43
Excavation on 15½ chains, av depth 5 feet, 5862 cubic yds at 8 cents	468 96
Embankment on 8½ chains, av depth 3·4 feet, 1778 cubic yards at 10 cents	177 80
Excavation and embankment on 14 chains, 731 cubic yds at 7 cents	51 17

Excavation on 9¼ chains, depth 7·6 feet, 2746 cubic yds at 8 cents	219 68
Embankment on 3¼ chains, depth 1·3 feet, 127 cubic yds at 9 cents	11 43
One under drain	14 00
	$ 1,114 05

Mile 65th. This section pierces at beginning a ridge of easy excavation near Drove tavern, passing 20 feet under P. and L. turnpike at 16th milestone, thence is located in the rear of Spring tavern (sign of Washington) and recrossing turnpike, passes two ravines with culverts, soil micaceous slate, loam and gravel.

Excavation at Reesville on 18.65 chs, av depth 18·1 feet 35872 cubic yards at 12 cents	4,304 64
Embankment on 8.28 chs, av depth 4.4 ft, 2364 cubic yds at 10 cents	236 40
Excavation on 12.08 chains av depth 3.3 feet 2887 cubic yards at 8 cents	230 96
Embankment on 9.30 chains, av depth 8.9 feet 6249 cubic yards at 12	749 88
Excavation on 9¾ chs, av depth 9.5 feet 7689 c y at 9 cts	692 01
Embankment on 8.54 chs, av depth 11.$\frac{2}{10}$ feet, greatest depth 24.2 feet 7878 cubic yards at 14 cents	1,102 92
Excavation on 6.21 chs, av depth 13.4 ft 7892 c y at 9 cts	710 28
Three culverts of 6, 5 and 3 feet	465 00
	$8492 09

Mile 66th. The first part of the line is traced over undulating ground, crossing Lamb tavern ravine with a balustrade bridge, after which the surface of the ground assumes a more even character and after passing behind Mrs. Henderson's house, it crosses the P. and L. pike and ends on west side of old Lancaster road.

Excavation on 4.35 chs, av depth 5.6 ft, 1849 cubic yds at 8 cents	147 92
Excavation and embankment on 10 chs, 1604 c y at 8 cts	128 32
Embankment at east and west end of bridge over ravine on 7.97 chs, depth 14 feet 2760 cubic yds at 11 cents	303 60
Excavation on 9.5 ch, av dep 5.6 ft, 4084 c yds at 8 cts	326 72
Excavation & embankment on 39.65 ch, 4031 c y at 7 cts	282 17
Bridge 297 feet	2,219 24
Two under drains	230 00
	3,435 97

Mile 67th. The beginning of this section crosses the old Lancaster road, it is then traced along a gentle side hill, intersecting a ravine near Mrs. Grover's, and passing through her garden crosses the dividing ridge of the waters of Gulf run and a branch of Darby creek, it terminates near Siter's lane, soil loam and clay.

Embankment on 2.95 chs, av depth 4.2 feet 789 cubic yards at 10 cents	78 90

Side cutting on 12 chs, 207 cubic yds at 6 cents	12 42
Excavation on 13 chs, av depth 3.1 ft, 2933 c y at 7 cts	205 31
Embankment on 9.70 chs, av depth 4.3 feet, 2648 cubic yards at 12 cents	317 76
Embankment on 14½ chs av depth 2.8 feet 2459 cubic yds at 11 cents	270 49
Excavation on 15.77 chs, ⋈ section 1.5 sq. 338 cubic yds at 6 cents	20 28
Excavation on 9.15 chs, av depth 2.3 ft, 1477 c y at 7 cts	103 39
One culvert 6 feet and one under drain	210 00
	$ 1218 55

Mile 68th Is located on the dividing ridge over very favorable ground, and passing Mrs. Abram's house, it crosses Moul's ravine with a balustrade bridge—ends near R. Kimber's, a few chains north of the turnpike. Soil, loam.

Excavation on 9,85 chs, av dep 3 ft, 2,111 cu yds at 8 cts	168 88
Embankment on 7⅓ chs, av dep 3 ft, 1,391 c yds at 10 cts	139 10
Excavation on 13.5 chs, av dep 3.1 ft, 2,980 c yds at 8 cts	238 40
Side cutting on 9 chs, ⋈ sec 1.2 sq, 164 c yds at 6 cts	9 84
Excavation on 4 chs, depth 3·6 feet, 522 c yds at 7 cents	36 54
Embankment at east and west end of bridge over Maul's ravine on 5.55 chs, dep 14 ft. 2,265 c yds at 11 cents	249 15
Excavation on 7.68 chs, av dep 2.6 ft, 1,408 c yds at 7 cts	98 56
Embankment on 7.70 chs, dep 2.5 ft, 557 c yds at 10 cts	55 70
Moul's bridge 558 feet	3,697 27
Two under drains	28
	4,721 44

Mile 69th. Is traced on a favourable side hill, crossing the intersection of King of Prussia and Gulf mill roads.

Excavation on 7.53 chs, dep 5.6 ft, 1636 c yds at 8 cts	130 88
Embankment on 8.55 chs, dep 3 8 ft 974 c yds, at 10 cts	97 40
Excavation on 20 ch, av dep 3.3 ft 4303 c yds at 9 cts	432 27
Excavation and embankment on 38 ch 2986 c yds at 7 cts	209 02
Excavation on 5.15 ch, av dep 6.7 ft 2714 c yds at 8 cts	217 12
Two under drains	28 00
	$1,114 69

Mile 70th. The first part of this line passes over an uneven side hill, then crossing a branch of Darby creek, enters Rudolph ridge which it pierces 19.8 feet. Soil easy excavation.

Excavation on 8 ch, av dep 6.3 feet 3956 c yds at 8 cts	316 48
Embankment on 5.83 ch, dep 3 feet 513 c yds at 10 cts	51 30
Embankment on 9.85 ch, dep 8.9 ft 6511 c yds at 12	781 32
Excavation on 5.40 ch, av dep 2ft 784 c yds at 7 cts	54 88
Excavation and embankment on 10 ch, 332 c yds at 7 cts	23 24
Embankment on 8 ch, av dep 8.1 ft 4746 c yds at 12 cts	569 52
Excavation on 9½ ch, av dep 6·6 ft 4927 c yds at 8cts	394 16

Excavation on 20.15 ch, part of Rudolph's ridge av dep 18.8 26,442 c yds at 14 cts	3,701 88
Two culverts of 5 and 6 ft	245 00
	6,137 78

Mile 71st Is located on undulating ground, crossing county line Road. Soil loam, &c.

Excavation on 17.85 chs, av dep 3.4 ft 4587 c yds at 9 cts	394 83
Excavation and embankment on 10 90 ch 474 c yds at 7 cts	33 18
Embankment on 10.10 chs, av dep 4 7 ft 3130 c yds at 10 cts	313 00
Excavation on 14 chs, av dep 6.9 ft 7690 c yds at 8 cts	615 20
Embankment on 4¼ ch, dep 5.7 ft 809 c yds at 9 cts	72 81
Excavation on 6¾ ch. av dep 4.4 ft 2203 c yds at 7 cts	154 21
Embankment on 5¾ ch dep 8.6 ft 1676 c yds at 10cts	167 60
Excavation on 4.90 ch, av dep 4,5 feet 1622 c yds at 7 cts	113 51
One culvert 1 ft and one under drain	94 00
	1,958 37

Mile 72d The line near its commencement crosses a break in the dividing ridge 20 feet in depth, then passes P. and L. Turnpike and intersects the old Lancaster road at the Union Tavern. It ends on N. side of Haverford road.

Embankment on 18.45 ch, av dep 11.4 ft 17,163 c yds at 15 cts	2,574 45
Excavation on 6.40 ch. av dep 1.4 ft 650 c yds at 7 cts	45 50
Embankment on 16.60 ch, av dep 3.8 ft 4037 c yds at 11 cts	444 07
Excavation on 9.90 ch, av dep 5.3 ft 3991 c yds at 8 cts	319 28
Embankment on 1.50 ch, dep 3·5 ft 145 c yds at 9 cts	13 05
Excavation on 7.70 ch av dep 6·6 ft 3996 c yds at 8 cts	319 68
Embankment on 7.50 ch av dep 3.4 ft 1582 c yds at 10 cts	158 20
Excavation on 6.15 ch, av dep 4.4 ft 2004 c yds at 8 cts	160 32
One culvert 3 ft and one under drain	73 00
	$4,107 55

Mile 73d This section is traced over an undulating ground, south of the Buck tavern, and terminates on the west side of Price's Ravine.

Excavation and embankment on 7 85 ch, 420 c yds at 8 cts	33 60
Excavation on 16¼ ch dep 4.3 ft 2518 c yds at 8 cts	201 44
Double drain on 7¾ ch, 75 c yds at 6 cts	4 50
Embankment on 7¾ ch av dep 4.9 ft 2521 c yds at 11 cts	277 31
Excavation on 16 ch av dep 7 ft 8879 c yds at 9 cts	799 11
Excavation on 22.15 ch av dep 9.1 f, 1718 c yds at 9cts	1,540 62
One culvert of 5 feet	135 00
	$2,991 58

Mile 74th At the beginning the line crosses a ravine with a qallustrade bridge, after which it passes over favourable ground.

Excavation on 1.87 ch, av dep 3 4 ft 462 c yds at 8 cts	36 96
Embankment at east and west end of bridge over ravine 10.54 ch, dep 14 ft 3975 c yds at 11 cts	437 25
Excavation on 5.58 av ch dep 2,7 ft 1062 c yds at 7 cts	74 34
Embankment on 18.42 ch, av dep 4.6 ft 5539 c yds at 12 cts	664 68
Excavation on 13 ch, av dep 3.4 ft 3179 c yds at 8 cts	254 32
Embankment 11.65 ch, av dep 2½ ft 1720 c yds at 10 cts	172,00
Bridge of 462 ft	3,122 35
Under drain	14 00
	$4,775 90

Mile 75th. After crossing the old Lancaster road it is traced on favourable ground north of widow Jones'. Soil clay and gravel.

Excavation on 9.75 ch, av dep 3.3 ft 2350 c yds at 8 cts	188 00
Embankment on 16.60 ch, av dep 3½ ft 3638 c yds at 11 cts	400 18
Excavation on 11 ch, av dep 2.7 ft 2101 c yds at 7 cts	147 07
Embankment on 4 ch av dep 1 3 ft 285 c yds at 9 cts	25 65
Excavation on 23 ch, av dep 4.7 ft 8111 c yds at 8 cts	648 88
Embankment on 10.15 ch, ay dep 1.4 ft 826 c yds at 9 cts	74 34
Culvert of 3 ft	65 00
	$1,549 12

Mile 76th. Commences at old Lan. Road, and passing South of Libertyville on even ground, it terminates a few chains south of Merion Meeting House, soil as above.

Excavation on 10.85 ch, av dep 4½ ft 3659 c yds at 8 cts	292.72
Excavation on 7 ch, dep 2 ft 519 c yds at 7 cts	36 33
Embankment on 9 ch, av dep 3.2 ft 1770 c yds at 11 cts	194 70
Excavation on 24½ ch, av dep 3.1 ft 5492 c yds at 8 cts	439 39
Embankment on 4 ch, dep 2 ft 228 c yds at 9 cts	20 52
Embankment on 8 ch, dep 5 ft 1239 c yds at 10 cts	123 90
Embankment on 8 ch, dep, 3.6 ft 859 c yds at 10 cts	85 90
Double drain on 5.15 ch, 50 c yds at 6 cts	3 00
	$1,196 43

Mile 77th, Crosses a small ravine in front of the General Wayne tavern, and then follows the course of the old Lancaster road, which it leaves at the seven mile stone, thence diverging northeastwardly, it pierces a ridge 14 feet deep at the apex.

Embankment on 11.35 ch, av dept 4.2 ft, 3093 c yds at 12 cts.	371 16
Excavation on 10¼ ch, av dept 7.3 ft, 5989 c yds at 8 cts	479 12
do on 2¾ ch. dept 3.6 ft, 357 c yds at 7 cts	24 99
Embankment on 3.02 ch dept 9 ft, 971 c yds at 10 cts	97 10

Excavation on 6.08 ch, av dept 5.4 ft. 2481 c yds at 8 cts	198	48
Embankment on 9 ch, dept 4½ ft, 1238 c yds at 10 cts	123	80
Excavation on 30.15 ch, av dept 7.8 ft, 19,105 c yds at 9 cts	1719	45
Two culverts of 4 and 3 ft	155	
	3169	10

Mile 78th, Is traced over undulating ground and crosses the Falls Bridge road. Soil loam and clay.

Excavation on 12.35 ch, av dept 4.7 ft 4336 c yds at 8 cts	346	88
do on 8 ch, av dept 3.9 ft, 2277 c yds at 7 cts	159	39
Embankment on 11½ ch, av dept 4.9 ft, 3705 c yds 11 cts	407	55
do on 9 ch, av dept 2.9 feet 1615 c yds at 10 cts	161	50
Excavation on 8 ch, av dept 9.- ft. 6235 c yds at 8 cts	498	80
Embankment on 6½ ch, dept 10.9 ft, 2534 c yds at 11 cts	278	74
Excavation on 1 ch, av dept 5 ft, 376 c yds at 7 cts	26	32
Embankment on 3½ ch, dept 3.5 ft, 579 c yds at 9 cts	52	11
do on 1½ ch, dept 1.9 ft, 81 c yds at 8 cts	6	48
Excavation on 7.15 ch, av dept 4.7 ft 2496 c yds at 8 cts	199	68
Two under drains and one culvert 4 ft	118	
	$2255	45

Mile 79th, This section near its commencement crosses Georges' ravine, then is traced on favorable ground to the head of the inclined plane.

Excavation on 7 ch, av dept 3 ft, 1507, c yds at 7 cts	105	49
Embankment at east and west ends of bridge over Georges' ravine on 3.15 ch, dept 14 ft 1256 c yds at 10 cts	125	60
Excavation on 27.80 ch, av dept 4.7 ft, 9650 at 9 cts	868	50
Embankment on 2.39 ch, dept 1.4 ft, 94 c yds at 9 cts	8	46
Excavation on 11.61 ch, dept 4 ft, 1570 c yds at 7 cts	109	90
Embankment on 10.65 ch, av dept 3.9 ft, 2660 c yds at 10 cts	266	
Excavation on 7 ch, av dept 2.4 ft, 1190 c yds at 8 cts	95	20
Bridge over Georges' ravine 300 ft	2219	24
	$3798	39

Mile 80th, Includes the inclined planes—a bridge across Schuylkill river and enters the bed of the old Union canal.

Excavation on 7.35 chains—average depth 8.9 feet, 5507 cubic yards at 8 cents	440	56
Embankment on 11 ch av dept 5.9 ft, 4411 c yards at 11 cents	485	21
Excavation on 8½ ch, av dept 14.7 ft, 12,210 c yds at 9 cts	1098	90
Embankment at west end of Schuylkill bridge, on 10½ ch, dept 23.3 ft, 19,257 c yds at 14 cts	2695	98

Excavation on 12 ch, 1308 c yds at 10 cts	130 80
Embankment on 5½ ch, dept 7.3 ft, 1315 c yds at 10 cts	131 80
Excavation on 7.37 ch, av dept 1 ft, 539 c yds at 7 cts	37 73
Schuylkill bridge, 965 ft,	
One culvert 8 ft and one under drain	75
	$3,095 98

Mile 81*st*, Occupies the bed and towing path of the old Union canal. There is rock which must be removed on this section.

Excavation 11,616 c yds at 10 cts	1161 60
Embankment 345 c yds at 12 cts	41 40
	$1203

Mile 82*d*, Old Union canal.

Excavation 7607 c yds at 15 cts	1141 5
Embankment 587 c yds at 10 cts	58 70
One culvert 3 ft	60
	$1259 75

Mile 83*d*, Diverges from old Union canal, enters Broad and intersects Vine street.

Excavation 3411 c yds at 10 cts	341 10
Embankment 2398 c yds at 12 cts	261 76
One culvert 4ft	80
	$702 86

SUMMARY

Of Eastern Division of Pennsylvania Railway.

Mile 30	$17,184 25
31	3,833
32	4,408 81
33	3,747 32
34	5,139 20
35	878 8
36	2,168 48
37	4,770 78
38	2,761 90
39	21,977 95
40	1,529 80

41	2,029 30
42	4,439 81
43	31,197 18
44	1,031 99
45	414
46	519 06
47	617 03
48	1,624 67
49	16,980 70
50	3,158 10
51	6,192 60
52	17,062 42
53	8,106 02
54	1,647 78
55	6,801 47
56	3,203 11
57	6,265 83
58	2,273 81
59	32,411 44
60	6,519 91
61	708 73
62	1,868 84
63	1,059 48
64	1,114 05
65	3,492 09
66	3,435 97
67	1,218 55
68	4,7[illegible]1 44
69	1,114 69
70	6,137 78
71	1,958 37
72	4,107 55
73	2,991 58
74	4,775 90
75	1,549 12
76	1,19[illegible] 43
77	3,169 10
78	2,255 45
79	3,798 39
80	5,095 98
81	1,203
82	1,259 75
83	702 86
	284,811 45
Schuylkill bridge upon the principles of Town's patent	46,344 76
	331,156 21

GRADUATION TABLE.

	Chains.	Ascending east.	Descending east.
1	30.24	27.5	
2	211.15		27.5
3	21	27.5	
4	12		27.5
5	92	27.5	
6	7	level.	
7	89	27.5	
8	9		20
9	48	24	
10	534.30		27.5
11	12.84		20
12	11	10	
13	9		24
14	8	level.	
15	7		24
16	4	16	
17	9	24	
18	27	16	
19	14		27.5
20	15	level.	
21	10		27.5
22	17	27.5	
23	245		27.5
24	13	27.5	
25	160.10		27.5
26	121	27.5	
27	12	level.	
28	44.60	27.5	
29	666.40	28	
30	12		27.5
31	21	28	
32	6.12	29.8	
33	30		24.6
34	30	24	
35	7		26
36	12	16	
37	103.60		28
38	19	26	
39	31	Level.	
40	14	18	
41	61		28
42	207.50		29.8
43	17		28
44	85		29
45	12	24	
46	4		24
47	9	24	
48	18		26
49	16	26	
50	17	24	
51	80	27.5	
52	119		28
53	31	24	
54	13	level.	
55	45		24
56	8	26	
57	80		28
58	6	level.	
59	13		26
60	17		16
61	11		24
62	4	level.	
63	13	26	
64	14		18
65	118		30
66	7	level.	
67	8	26	
68	24		28
69	14		24
70	174		29.8
71	39.02	inc. plane.	4.3 p ch.
72	12.12		29
73	13	20	
74	240.73		1.4
75	9.17		28

Stone suitable for the construction of the bridges, culverts, &c. is found generally either on the line itself from the cuttings, or its neighborhood. The supply from the former being ascertained from such borings as could be effected, to be inadequate for our purpose, I have therefore in the estimate for excavations charged the same to the full depth as common earth, making up the deficiency, should rock be found, in the estimated price of that material in the other contingent parts of the rail-way.

I would respectfully suggest to the consultation of the board, the propriety of separating the contracts for road forming and laying the rails; so that the latter may embrace within its contract the broken stone and blocks on which the rails are to be placed.

The cost for grading and bridging upon the eastern division of the rail-way, has been considerably increased by the expense incurred on the new line from Coatsville to the summit in Thomas' field, which is an extent of nearly 18 miles.

The impracticability of finding last year any passage by which we could leave Chester valley from the white horse summit, to that on Mrs. Grove's land, rendered it then necessary that this section should be left open for future examinations; under such circumstances I could therefore only give, in order to close the estimate, its probable cost.

In the present location it has been a consideration of some importance to diminish distance; and when the amount of cost upon the whole line to gain this advantage did not extend to an unreasonable sum, I never hesitated to incur the expense.

The extent of the located line from Columbia to the seven mile stone, which as before observed, was the point at which the explorations of last year terminated, is about nine (9) miles shorter than the explored line. The value of this saving in distance, so far as regards its effect upon the diminution in time of transportation, more than compensates for the additional cost incurred for road forming.

The whole estimated expense last year for the rail-way, from Columbia to the seven mile stone, is stated in the report then made at $1,013,019,$\frac{13}{100}$ and the estimates for one mile of double way of $8079,$\frac{53}{100}$ (exclusive of road forming) according to the present reduced price of iron (the materials made use of being wood, iron and stone,) is amply sufficient for that construction.

I will now give for the information of the board, first, a comparative statement of the expense of the present location, with the explored line of last year as far as the seven mile stone where it terminated; and then the extension of the estimate to Vine street in Philadelphia, the materials for the rail way being of wood, iron and stone—secondly, the probable estimate where the construction of rail-way is of iron and stone, similar to the plan adopted in Great Britain.

1st. Comparative estimate to the 7 mile stone.

Common road forming from Columbia to the 7 mile st.	$388,127	07
Add for superintendance and other contingencies	38,812	70
	42,,939	77
To 73.55 miles of rail-way, the materials being iron, wood and stone at $8070,$\frac{53}{100}$ pr. mile	594,249	46
To laying the rails upon bridges, materials of wood and iron	8,906	56
To one stationary steam engine at Columbia	6,000	00
	$ 1,036,095	76
To amount of estimate of the explored line to same point	1,013,019	13
Balance against present location	23,076	63

Estimate of the whole line from Columbia to Vine street in Philadelphia		
Road forming from Columbia to Vine street	450,506 71	
Add for contingencies	45,050 67	
	495,557 38	
To 79.42 miles of rail-way, the materials being iron, wood and stone at $8079,$^{53}_{100}$ pr. mile	641,676 27	
To rails for the bridges, materials of wood and iron	10,066 16	
Two steam engines, on Susquehanna and Schuylkill	14,000 00	
Total amount of cost of the rail-way		$1,161,299 81
Probable cost of rail-way, where iron and stone are only used.		
Iron rails (malleable) weight of rail per yard, 28lb. for double tracks, 88 tons per mile delivered at 65 dollars per ton	5,720 00	
For sidelings	143 00	
Cast iron chairs 18,267 tons at 45^{50}_{100}$ per ton	831 14	
Iron pins to fix rails to chairs	36 00	
	$6,730 14	
Add duty to U. S. at 25 per cent at val.	1,682 53	
	8,412 67	
Broken stone for paving horse path and embedding the block on which rails are placed	969 92	
Blocks of stone and placing them, fixing rails, &c.	1,834 73	
	2,804 65	
Add for contingencies	280 46	
	3,085 11	
Total cost for a mile of rail-way	$ 11,497 78	
To 79.42 miles of rail-way at $11. 97,$^{78}_{100}$ per mile	913,143 68	
To amount for bridges, using wooden rails plated with iron	10,066 16	
To grading and bridging the road †	495,557 38	
Carried forward	1,418,767 22	

* The weight of 28 lb. per lineal yard for the malleable iron rail enables it to sustain the pressure of the locomotive steam engine, and still retain its original form without a permanent deflexion. Should horse power be considered as best adapted for propelli g the rail way carriages in this country, a reduction of two or three pounds in the weight of the rail as estimated, may be safely made

† Should the plan of forming the rail-way with iron and stone be adopted, this item may be reduced one twelfth as the space required in the cuttings for the other method may be diminished about four feet.

Brought forward	1,418,767 22
For two steam engines	14,000 00
Total cost from Columbia to Philadelphia	$1,432,767 22
Cost of road as above, using wood, iron and stone	1,161,299 81
Difference between the two methods	$ 271,467 41

But should the duty on iron for rail ways be remitted by the government the difference would be only $137,841,$\frac{88}{100}$ neither of which in so great an undertaking, ought to be considered when the comparison is made between perishable and imperishable materials.

In approaching so large a city as Philadelphia with a railway, it is important that from some point in its neighborhood branch lines should be constructed, in order to accommodate the various commercial interests of that community, and to extend the whole benefit of such a line of communication with the interior, not only to the streets of a city, but also to the shipping.

Under such a view of the beneficial effect it might have in and around Philadelphia, I take the liberty of recommending to the board, that from the termination of the inclined plane, east of the residence of the late Judge Peters, a branch of the railway should be extended along the margin of Schuylkill river, terminating at a suitable place of deposit near the tide water, and opposite to the city of Philadelphia.

In concluding this report upon the location and estimate of the Pennsylvania railway, I beg leave to express the friendly disposition and assistence given me in promoting the objects of the survey, by the inhabitants of Columbia, the committee appointed by the select and common councils of the city of Lancaster, and its citizens generally, also the committees of various sections of Chester county, and of Philadelphia. I am likewise indebted to Mr. Scott, the principal assistant engineer, for his services in the field, and great accuracy in the delineations explanatory of this report, as well as to each of the individuals composing the locating and exploring corps, for ability, zeal and correct deportment.

All which is respectfully submitted.

JOHN WILSON,
Engineer.

Philadelphia, Dec. 1st, 1828

No. 8.

Report and estimate on the survey of a canal line, from Easton to Carpenter's point, by D. B. Douglass, Engineer.

To Joseph M'Ilwaine, Esq.
Secretary of the Pennsylvania board of canal commissioners.

Dear Sir,

I have the honor to communicate for the information of the board, the following calculations and estimates for a canal down the Delaware, from the vicinity of Carpenter's point to Easton, the route of which was explored and surveyed by the party under my directions, in the months of July and August last.

Topographical character of the route.

It will be remembered that the valley of the Delaware, within the limits of this survey, is bounded generally on both sides by ranges of high and steep hills, having an interval of alluvion or bottom land from a quarter of a mile to a mile and a half in width, through which the river winds it way. On a large proportion of the route, this interval is of the most favorable character and sufficiently wide on the Pennsylvania side, for the construction and safety of the canal; but in some places the river closes upon the *second bank*, or upon the slopes of the higher ground in such a manner as to require for the support of the canal, an artificial terrace and slope wall.

At three places in the course of the route, the river traverses distinct ranges of mountains. The first at Walpack bend, the second at the Water gap, and the third at the Wygaat mountain near Easton. Here the border of alluvion disappears altogether, the river is reduced to a narrow defile, and its shores become rocky and precipitous. Shores partaking in a less degree of this character, are also found in some other parts of the line. One or two instances of moderate extent occur between Walpack and the Water gap, and again somewhat more extensively between the latter and Easton. The rock in all cases is lime-stone or slate, except at the Water gap and the Wygaat, at the former of which it is chiefly sand stone, and at the latter, what would commonly be denominated granite. A small intermixture of sand stone is also seen at the upper commencement of Walpack bend.

Several tributaries of the Delaware intersect it, within the range of our survey, and furnish deep undulations and secondary valleys in the slopes of the primary one. As these valleys however, seldom run as low as the alluvial bottom of the latter, they offer no serious dificulty in the construction of the canal. The most considerable of the streams are the Bushkill and Broadhead creeks, besides which, are the the Sawkill, Ranny's kill, Dingman's creek, Cherry creek, Kobus' kill, Martin's creek, the lower Bushkill and

many others. Several of these if necessary, can be introduced as feeders into the canal.

Dimensions of the Canal.

The plans and calculations which follow, have been made out for *two different* scales of construction. One adapted to locks of the width of *eleven* feet, and the other to those of *nine* feet. The canal, in the former case, is supposed 40 feet wide at the surface, 25 feet at the bottom, and 5 feet deep, which answers well for boats of 40 tons; in the latter it is assumed 32 feet wide at the surface, 20 at bottom, and 4 feet deep, which is a proper water-way for boats of 25 tons.

The lifts of the locks are taken in both cases, at from 9 to 10 feet, according to the supply of water.

General principles of the location.

As the Bluffs constitute the chief difficulty of this route, the levels and location must be adjusted in some measure, with reference to them. In some instances where the Bluffs are of inconsiderable height, the previous levels have been kept up so as to afford a moderate *thorough-cut*, without exposing the canal to the action of the river at all. But in other cases where the height has been too great for this, so as to render a construction along the face of the Bluffs unavoidable, the opposite mode has generally been pursued with the levels, by dropping them as low as the floods of the river would permit.

Where Bluffs have not intervened, and generally in tracing the location through the flats, the levels have been governed with a view to the saving of distance, whenever this could be done without sacrificing any considerable advantage in other respects.

To these preliminary observations, I beg leave to add a few remarks on the location and construction of the principal works of the line, before proceeding to the estimate.

1*st. The dam across the Delaware, at the head of the line.*

This has been located, after a careful examination of the ground at a reef, called "*Peter's Rift*," about three-fourths of a mile above Carpenter's point. The river, it is true, is a little wider at this place then at Dunning's ferry, a mile and a half further up, but its advantages in other respects, and particularly with reference to the connexion of this navigation with the Delaware and Hudson canal, are such as I conceive, justly entitle it to the preference. It is situated, for example, in the shortest and most direct line to the Delaware and Hudson canal, and affords an intersection with that navigation near the bend of Port Jervis, equally convenient for the trade of both directions.

2dly. It cuts off more than *a mile and a half* of expensive construction along the margin of the river, on the Pennsylvania side. And 3dly. It affords great facility for leading off the canal, *immediately*, on the line of its general direction, even with a dam of no more than seven or eight feet in height. It may be added to these

remarks also, as a mere point of fact, that with respect to the canal now under consideration, this location takes off *nearly ten feet of lockage.*

It is proposed to construct the dam at this place with a waster of 600 feet, and with a curvature of 20 feet up stream, to adjust the work in such a manner that the *foot of the apron* shall, at the same time, range in a *direct line across the stream.* This will give a very lengthened slope to the apron *in the middle,* where it is also proposed to make the lip of the waster a *foot and a half lower* than at the wings. The level to be retained is 10½ feet below bench No. 2. A dam thus constructed, besides being very strong, will be perfectly safe and convenient for the passage of rafts and river craft at all stages of the water.

2nd. The line from Carpenter's point to the crossing of the Bushkill.

This division of the route comprehends about two miles of Bluffs and sidelings, requiring the construction by terrace and slope wall, principally at Milford, Cave bank, the Bluffs near judge Dingman's, and that above Daniel Hornbacks. In the generality of these cases the terrace may be formed in the ordinary way of excavation and embankment, but on a part of that at Milford, and also of that at Cave bank, it is thought more advisable to construct it entirely exterior to the present slope. Besides the localities mentioned, there are also about the same length of sidelings in different parts of this sub-division which are in a great measure avoided by the management of the levels, as heretofore explained, and paved by extra cuttings from above, only one of which exceeds sixteen feet in the deepest part. In all other respects this portion of the route is favorable, being composed almost wholly of fine arable flats and light soil.

A basin is projected in the mouth of the Sawkill opposite Milford, but which requires no extra expense. All the other streams are passed by culverts.

3d. Crossing at Bushhill.

This is proposed by means of a dam, with an embankment of moderate height across the flats to the *second bank* on the south side and bringing down the line to the level of the reservoir thus formed, by a lock of 9 feet, connected with the abutment of the dam on the north side. This crossing might be effected by means of a wooden aqueduct without bringing down the line; but this would require a very expensive embankment across the flats, and the addition of a separate dam and feeder for the supply of the canal—to which the plan proposed is considered decidedly preferable. A spacious waste wier is projected for this dam, to consist of five sections, with intermediate piers of masonry, upon which the tow path bridge is supported, and a grating for the security of the navigation in times of high water.

4th. Walpack Bend.

The laurel region of Walpack Bend, commonly designated by the name of "*Greenland*" has without impropriety been considered

as one of the chief difficulties of this route, The flats here, as already observed, disappear entirely, and the river closes to the very base of the mountain. This mountain is composed of alternating strata of limestone and slate, the ledges of which, covered with a partial layer of soil, constitute the face of the slope on which the line of canal is to be constructed. The water however, is not deep, and with a little labour in blasting, there is the greatest abundance of material, both for the terrace and its protecting walls.

The whole length of this reach is about a mile, and as it makes a very deep inflexion in the line, with a considerable increase of its neat length. I was induced to examine the mountain transversely, with reference to the practicability of a tunnel, by which this circuitous bend and a part at least, of the difficult construction at the base of the mountain, might be avoided. The result proved more favourable than I expected. It was discovered, that at a little more than six hundred yards from the beginning of the laurel region, and about nine hundred from the end, a line of only 266 yards would reach through the mountain to the flats on the opposite side; which, by a remarkable conformation at this particular point, afforded a choice of levels and the most favourable ground almost at the very base of the rocks. The species of the rock as already observed, is limestone and slate, of which the latter appears predominant; and it may be added, that from the order and position of the strata, it is extremely improbable that any other kind of rock will be met with in the excavation of a tunnel at this place.

The expense of excavating a tunnel under such circumstances it is not difficult to calculate. It requires neither *shafts*, *shoaring*, or *lining*, and to many of the incidental difficulties and expenses, therefore, of an ordinary tunnel, it is wholly unexposed. The cubic quantity of the excavation and the price per yard, sufficiently augmented to cover all the difficulty of excavating in a confined situation, furnish at once, and with certainty the most important item of the estimate. The expense of rock excavation under such circumstances, including its removal along the drift to an extreme distance of *ninety* yards, has been taken at one dollar per cubic yard, by the United States board of engineers in the case of the Chesapeake and Ohio canals. The excavation in the deep cut at Lock Port, which is an extremely hard lime stone, and in a situation almost as confined as a tunnel, cost $1 75 per cubic yard. The tunnel on the Schuylkill navigation, through a hard slate rock requiring blast, cost $2 00 per cubic yard; that on the Union canal, also in slate, a few cents more, and the same kind of rock in the open air 50 cents per yard. This last fact gives the ratio of tunnel excavation, to that in the open air in the case of the Union tunnel as 4 to 1, which agrees very nearly with results furnished by the tunnel at Mauch Chunk, if we reduce the drifts to the same length, which we must also remark is a greater one than will be required at Walpack bend.

The excavation of the rocks at Walpack bend, in the open air, cannot reasonably be estimated, according to prices paid elsewhere on the Pennsylvania canals, at more than 50 cents per cubic yard, and it might safely be inferred therefore, from what has been stated that the excavations in the tunnel would not exceed 2 dollars per cubic yard; for the greater certainty however, I have taken it in the estimate at $2 50.

The dimensions proposed for this tunnel are 15 feet average height, and a width of five feet in addition to the width of a lock; that is, 16 feet for the large canal and 14 for the small. Four feet of this width in either case, to be occupied by a wooden gallery for the towing path, supported on wrought iron staunchers, and bolted to the side of the tunnel. This will suffice without recesses for the passage of one boat at a time, which is abundantly sufficient, considering that the whole length of the drift is scarcely equal to the Rochester aqueduct. With these measures, and the rate per yard as above, and making allowances equally liberal, for the other items of the construction, it will be seen by the comparative estimate hereafter given, that a saving of nearly nine thousand dollars will still be accomplished on the large canal and six thousand on the small one, by taking the tunnel route in preference to that round the point; and in distance a mile and a quarter. I have not hesitated therefore, in presenting this as the proper location, but that the purposes of the board may be answered under every possible view of the case, I have also given a location and estimate for the route round the Bend,

5th. From Walpack Bend to Broadhead's creek.

There are a mile and a half of bluffs and sidelings in this division requiring slope wall, &c. of which 650 yards contain ledges of limestone in different proportions. The construction in these cases, however, does not materially differ from that generally employed, except that the terrace is more exclusively exterior to the face of the present slopes. The quantity of terrace work is thus increased, and in some instances also the price a little enhanced by the less facility of procuring earth; but on the other hand the ledges of rock afford the material for slope walling at a more easy rate, and in this way probably reduce the aggregate expense in all ordinary cases, to about the same as for other slopes. There are also in addition to the above, about 1200 yards of sideling ground, on which slope wall is avoided by cuttings, generally of moderate depth, but in one instance amounting on a short distance, and with very easy digging, to 25 feet. Small proportions of limestone are contained in about 300 yards of the bluffs last mentioned.

No other constructions worthy of note occur on this sub-division, the generality of the remainder consists of fine level flats similar to those above Bushkill, already described.

6th. Crossing Broadhead's creek.

This is done by a wooden aqueduct and embankment across the

Flats. There is so little fall in the creek from the crossing place to its mouth, that it would bring the canal within the range of the Delaware floods to lock down and cross with a dam as at Rushkill, and to cross by this means, without locking down would be inexpedient in many points of view, and much more expensive than an aqueduct. A feeder dam is proposed about 400 yards above the aqueduct, and a line of feeder to intersect the canal at the south end of the embankment.

About 700 yards from the embankment of Broadhead's creek, the line crosses Cherry creek by a culvert or aqueduct of stone. Ledges of lime stone border this creek on the south side, and for a short distance the line is partially excavated in that rock.

7th. The Water Gap.

This is well known on the passage of the Delaware through the Blue ridge. At its entrance from the north it presents a range of high mural precipices almost at the water's edge; but these recede after about 400 yards, and the mountain assumes a natural slope, composed of a mixture of sand stone fragments and earth, with a narrow irregular border of alluvion along its base. Towards the lower extremity, the rock re-appears *in place*, and again forms a shore of a steep and rugged character. Total length of the pass about 2300 yards.

The construction of the canal through this gap will be nearly after the same manner as at Walpack and other places, where ledges of rock occur. In the north part, where the rocks are in mass and of great hardness, it will probably be attended with somewhat greater expense, and so also on a portion near the south end, but with these exceptions, the line through the Gap will assuredly be less expensive than along the mountain at the Walpack; the slope is more gentle, the rocks more in loose fragments, and the proportion of the earth much more considerable.

8th. From the water Gap to Long Rift.

This comprehends no species of construction that has not already been described. About 1,200 yards of Bluffs occur, requiring terrace; but of which only one reach of 800 yards, at the end of the fiftieth mile, is any way remarkable either for height or continuous extent.

No rock worthy of notice, and the remainder of the route favorable, with the exception of a few slight cuttings amounting to about 1000 yards in all.

9th. Long Rift.

The bluffs at this place differ from those heretofore described in being composed wholly of slate. The ledges of which rise rather precipitously to a height of from 20 to 80 feet, and then pass off with a more gradual slope and covering of soil. A broad water-worn shelf of the same rock skirts along the base, at 4 or 5 feet above the water, and forms a substantial foundation for the con-

struction of the canal, except along the southern part of the range which is formed by the alternation of rocky points of 10 or 12 feet in height, with pools of water.

The construction of the line along the higher parts of this bluff, will have to be chiefly *exterior*, unless these points should be chosen in quarrying stone for the slopes. Along the less elevated portions, it may be formed in the ordinary manner of earthy slopes, and often with almost as little labour.

The entire length of the bluff including a short distance on which the rock disappears, is about a mile.

10*th. Foul Rift.*

The shore opposite this reef is a bold, though not very elevated precipice of lime stone, and this description, connected with the known character of the rapid, will at once suggest the motive for a construction, by excavating from above, rather than terracing from below. For this purpose the levels are retained, from the foot of the 18th lock, four miles above, and thus a height gained by which the depth of cutting is reduced to about 12 feet in the deepest place; and the total extent of cutting in which rock predominates to about 600 yards. To pass this with as little expense as possible, it is proposed to excavate the canal, as far as the rock extends without slopes: retaining the same bottom breadth as elsewhere. The descent of the ground immediately after passing these ledges produces an unusual assemblage of locks at this place; three being placed in rapid succession, and a fourth, a short distance down the flat.

11*th. From Foul Rift to the Wygaat.*

The proportion of bluffs on this part of the line, is rather greater, for the distance, than any heretofore described; but as they involve no different modes of construction, it will not be necessary to notice them particularly. The whole extent of terrace work required is about two miles and a quarter, of which half a mile is rocky. There are also besides this, about 800 yards of steep rocky sideling near Martin's creek, where the line is formed by an excavation and embankment, supported in part by a rough masonry wall. A small portion of rock cutting also occurs in some other parts of the line not included in the preceding.

A wide stone culvert will be required for the passage of Martin's creek.

12*th. From the Wygaat to Easton.*

The construction of the canal on this remaining fraction of the route, will depend essentially upon the views that may be adopted with regard to the Delaware dam. Should such a dam be constructed in the vicinity of Easton, and of a sufficient height to serve as a feeder for the lower section of the Delaware canal, at its present assumed level, it would *back up*, in time of low water, about 4½

feet at the foot of the Wygaat rapid. In this case, the canal should be locked down just above the Wygaat mountain, and continued by a well protected tow-path along the margin of the lake thus formed. No difficulty would be experienced in graduating the level of the tow-path, to the range of high and low water, as that range would probably be diminished at least one half by the construction of the dam. At the Bushkill, a comparatively slight bridge only would be necessary for the accommodation of the tow-path; and from that to the mouth of the Lehigh, the connexion would be formed by a succession of piers and bridges passing nearly in a direct line under the Delaware bridge. This would admit the formation of basins in connexion with the canal, between the tow-path and Water street, which would have also an uninterrupted communication with the river at large. But should a different plan be adopted with regard to the dam, so as not to back up the water in the manner described, the mode of construction for the up-river canal would be essentially different. In that case the line, after a single lockage at the Wygaat would be terraced round the point of that mountain, and along the rocky sidelings between that and Easton, in the manner already explained for cases of this kind. It would then require a substantial aqueduct across the Bushkill, and an embankment along the front of the town, at least one lift higher than the surface of water in the former case, to secure it against the freshes of the river, and finally locking down into the head basin of the lower canal. This although it might be equally convenient for the inhabitants of Easton, as regards the trade of the canal above, would interrupt in some degree their communications with the river; and I need not add, that it would be much more expensive than the other construction. By the comparitive estimate given in a subsequent part of this report, it will be seen that the difference of expense will be $21,565, if a small canal be adopted, and $26,902, in the case of a large canal; and as I am not aware of any countervailing argument of equal weight, I have adopted the basin location as the basis of my calculations. The parallel location and estimate however, will furnish all necessary information in case this view should not be approved by the board.

The total length of the line thus described, is 66 miles and 126 rods, and the total lockage from the dam at Peter's Rift, to the level of the lower canal, 259 feet and a very small fraction. The total length of sidelings and bluffs, requiring any particularity of construction is 13¼ miles, of this four miles are passed by cuttings of various depths, generally moderate, viz. 1200 yards in lime stone ledges and the residue in earth. The remaining nine and a half miles is terraced, viz. three and a half miles along rocky slopes and six along those of clay ground, &c. These measures of course do not include the 900 yards of rocky slope avoided by the tunnel, nor the rocky sidelings between the Wygaat and Easton, avoided by the basin location. The remainder of the route, nearly 53 miles in length, consists chiefly of arable flats, very favorable in point of levels and soil.

Estimate.

In the following estimate the quantity and cost of every species of construction, including locks, is exhibited for each mile separately.

The quantities of excavation have been minutely calculated for every variation of the transverse section in each mile; and the prices per cubic yard, are inferred from the actual excavation of similar soils in the vicinity, or elsewhere, on the Pennsylvania canals, viz. for earth, as loam, clay, gravel, &c. from 7 to 10 cents; for rocky soil, from 12 to 25 cents; and for rocks of lime stone and hard slate, 40 to 50 cents; embankment 12 to 20 cents. The locks are estimated according to the prices of materials and workmanship, at 496 dollars per foot for the 9 feet locks, and at 576 dollars per foot for those of 11 feet. Culverts, estimated in like manner, are taken at 250 to 300 dollars for those of the smallest size; 450, for those of 5 feet; 650, for those of 8 feet, and larger sizes in proportion. Wooden constructions are only used as culverts or aqueducts when the situation does not admit of arching slope walls, for outside slopes, are taken at 30 to 60 cents per square yard, according to the facility of procuring stone; and for inside slopes, at 12 and 15 cents. Puddling 25 cents per cubic yard. Bridges, from 200 to 300 dollars each. Fencing, 240 dollars per mile. Grubbing, from 480 to 960 dollars. Roads, from 6 to 9 dollars per perch.

ESTIMATE.

The dam at Peters' Rift.

Waster 600 feet long with a curvature of 20 feet up stream, to be built of crib work, filled in with stone and finished with hewn timber, laid close in the thread of the stream with slopes up and down. The up-stream slope to have a uniform base of 18 feet, and to be well puddled and gravelled:—that down stream to have a base of 30 feet at the wings and 50 in the middle—height of the lip 9 feet above lowest water at the wings, and 7½ in the middle. Abutments to be of good masonry, filled up with gravel, 20 feet high and 48 feet up and down stream, with wings of masonry above and slope wall below—Estimate viz:

		Small Canal.			Large Canal.
Round timber framed down		27,900 feet at	7 cts	$1953	The same in all respects.
Squared do	do	27600	10	2760	
Filling in with stone		4080 yds	50	2040	
do	with gravel	18400	15	735	
Masonry exclusive of face dressing		760 p	$3	2280	
Face dressing	square feet	1920 ft	10	1920	
Coping	by the run	240	1 25	300	
Slope wall	square yd	1700 yds	50	850	
Puddle	cubic yd	900	25	225	
				11335	

1st Mile. Commencing with a guard lock at the dam—continues along shore 50 yards, and then rounds into its direction with an extreme of 11 feet, cutting above water line, which runs down to surface cutting at 780 yards Lock No 1 at 1000 yards from the guard lock—fine flats of sandy loam—very easy digging—estimate viz:

Excavation	59590 yds	at 7 cts	$4157 30		74440 yds at 7 cts		$5210 80
Slope wall	550	50	225		550	50	225
Culvert		$250	250				250

Guard lock	9 feet lift in high water			4464			5184
Lock No 1	10 feet lift			4960			5760
Bridges				500			500
Fence		2	250	240			240
				14,796 30			17,869 80

2d Mile Continues in the same course with the preceding, near the foot of the high land. Generally a level flat and easy digging.—Estimate viz.

Excavation	19800 yds at 8 cts		1584	25740 yds at 8 cts			2059 20
Embankment	15840	12	1900 80	15840	12		1900 80
2 culverts			700				700
2 bridges		$200	400		$200		400
Fence			240				240
			4824 80				5300

3d Mile Inclines towards the second bank, and begins to cut in near the end. Generally easy digging—rather gravelly towards the end. Estimate viz.

Excavation	29050 yds at 9 cts		2614 50	36780 yds at 9 cts			3310 20
Culvert			250				250
Bridge			200				200
Fence			240				240
			3304 50				4000 20

4th Mile. Extra cutting on the first half mile, along the brow of the bank; extreme depth 9 feet above water, remainder favourable, except heavy embankment at crossing Quick's tail race—easy digging. Estimate viz.

	Small Canal.		Large Canal.	
Excavation	45725 yds at 8 cts	3658	58075 yds at 8 cts	4646
Embankment	15400 12	1848	15400 12	1848
Culvert of 30 feet at Quick's tail race	810 p at $3	2420	890 p at $3	2670
2 ordinary culverts		850		850
2 bridges		400		400
Fence 3 and light grubbing 400 yards		340		340
		9516		10754

5th Mile, Passes along the face of a moderate second bank, one thousand yards, then locks down and keeps the flat to the end. Stones on the first part—light sandy loam on the last. Estimate viz.

Excavation	29760 yds at	9 cts	2678 40	37600 yds at	9 cts	3384
Culvert		$250	250	$250		250
Lock No 2	10 ft	496	4960	576		5760
2 bridges			400			400
Fence and 400 yards light grubbing			400			400
			8688 44			10194

6th Mile, Passes wholly through fine arable flats, lock No. 3 near the beginning—soil, light sandy loam. Estimate viz.

Excavation	31760 yds at	7 cts	2293 20	38760 yds at	7 cts	2713 20
Culvert			350			350
Lock No 3	10 ft	$496	4960	576		5760
2 bridges			400			400
Fence			240			240
			8173 20			9463 20

7th Mile. The first one thousand yards pass along the face of the Milford bluffs, requiring terrace and slope wall; except a small part near the Vandemark—cuts into the point of the bluff near the south end—dam at the Sawkill, with a waste of 60 feet in two sections and extreme height of 16—slight extra cutting near the end of the mile—soil gravelly.

Excavation		28900 yds at	8 cts	2312		35360 yds at	8 cts	2828	
Terrace embankment		75080	10	7508		98240	10	9824	
Slope wall outside	quare yds	10600	60	6360		10600	60	6360	
do do inside		4000	15	600				600	
Dam at Sawkill				2440				2440	
Culvert at Vandemark brook and 1 of 5 ft				1320				1320	
4 bridges			250	1000				1000	
Fence one-third				80				80	
				$21620				$24452	

8th Mile Takes the slope of the second bank back of Judge Brinks', and continues it to the end. Soil generally easy digging, with a mixture of gravel in places. Estimate, viz.

Excavation		26840 yds at	8 cts	2147 20		34680 yds at	8 cts	2774 40	
Embankment		8400	10	840		8400	10	840	
2 Culverts			$250	500				500	
4 bridges				1000				1000	
Fence and five hundred yds light grubbing				440				440	
				$4927 20				5554 40	

9th Mile. Extra cutting on a short distance near the beginning—passes close in front of W. Brink's barn, and thence makes a straight course, with ordinary cutting through a fine arable flat—very easy digging—light loam.

Estimate, viz. excavation		43080 yds at	7 cts	3015 60		51040 yds at	7 cts	3572 80	
2 bridges				500				500	
Fence and two hundred yds light grubbing				300				300	
				$3815 60				$4372 80	

	Small Canal.			Large canal.		
10th Mile, continues on a line with the preceding, very nearly, to the crossing of Ramyskill, and so passes 60 yards east of the present bridge. Lock No 4, north side of Ramyskill, graduates the line to the crossing level —lock No 5 near the end of the mill. Slight extra cutting at the point of hill, south of Ramyskill; arable flats light loam. Estimate, viz:						
Excavation	29480 yds at 7 cents		2063 60	39480 yds at 7 cts		2763 60
Embankment	8800	12	1056	8800	12	1056
Culverts, two arches at Ramyskill	864 per ⅛ 3		2592	930 per ⅛ 3		2790
Locks, No. 4 and 5	19 ft 496		9424	19 ft 576		10944
Bridges	3		700			700
Fence			240			240
			16,075 60			18,493 60
11th Mile continues near the foot of the upland, on favourable ground, to 700 yards, the beginning of Cave Bank —thence terrace and slope wall to the end. Clay loam on the first part, loose, indurated clay on the last. Estimate, viz:						
Excavation	8580 yds at 8 cts		686 40	11880 yds at 8 cts		950 40
Terrace embankment	77000	10	7700	88600	10	8860
Slope wall, square yds	11120	60	6672			6672
Culvert at Connesha brook			1060			1060
Bridge			200			200
Fence ½ and 1320 yards, very light grubbing,			476			476
			16,794 40			18,218 40
12th Mile. Bluff bank continues 880 yards, the line then cuts in with an extra cutting of 11 feet above water to which runs to surface cutting near the end of the mile. Soil of the bank light sand inclining to wash sandy loam on the last part, and very easy digging. Estimate, viz:						
Excavation	52800 yds at 7 cents		3696	63360 yds at 7 cts		4435 20

Terrace embankment	48400	9	4356	58080	9	5227 20
Slope wall outside square yards	7040	60	4224			4224
do inside do	5280	15	1056			1056
Puddle	1760	25	440	2200		550
Culverts		2	600			600
Bridges			200			200
Fence			120			120
			14,692			16,412 40

13*th Mile*, closes on the up-slope, and cuts in at 500 yards, then moderate extra cutting on the brow and face of the general slope to the end; soil on the first part light loam, then stony. Estimate, viz:

Excavation	68750 yds at 9 cts		6187 50	89100 yds at 9 cts		8019
Culverts	2		550			550
Bridge			200			200
Fence $\frac{1}{2}$ and grubbing on 520 yds			500			500
			7437 50			9269

14*th Mile*. Three hundred yards same as the preceding, then fine arable flats for 1200 yards; ground then becomes sideling, and requires slope wall on a small portion near the end; soil, light loam with some gravel; stony near the end. Estimate, viz.

Excavation	55900 yds at 8 cts		4472	70700 yds at 8 cts		5656
Embankment	1280	12	153 60	1280	12	153 60
Slope wall, sq yds	860	40	344			344
Culvert of	8 feet		650			650
Bridge			200			200
Fence, and 360 yds grubbing			456			456
			6275 60			7459 60

	Small Canal.			Large Canal.		
15th Mile. Slope wall continues to 150 yards. The line then gains the flats, with slight extra cutting, and continues on favourable ground to the end, except an embankment at Dingman's creek. Soil sandy loam; Estimate, viz:						
Excavation	35690 yds at	7 cts	2498 30	45490 yds at	7 cts	3184 30
Embankment	14300	12	1716			1716
Slope wall, sq yds	1650	40	660			660
Culvert at Dingman's creek	962 per	$3	2886	1044	$3	3132
Ordinary culvert			300			300
Bridges	2	$250	500			500
Fence and 300 yards light grubbing			360			360
			8900 30			9852 30
16th Mile, Descends by lock No. 6 to a lower level, and passes wholly through fine arable flats; soil, sandy loam. Estimate, viz:						
Excavation	36500 yds at	7 cts	2555	48490 yds at	7 cts	3394 30
Culvert			375			375
Lock No. 6	9½ ft	$496	4712			5473
Bridges	2		400			400
Fence			240			240
			8282			9882 30
17th mile passes wholly through fine arable flats, to the right bank of Hornbeck's brook; soil, sandy loam. Estimate, viz:						
Excavation	31260 yds at	7 cts	2188 20	41140 yds at	7 cts	2879 80
Embankment	10600	12	1272	10600	12	1272
Wooden aqueduct at Hornbeck's, 3 spans 20 ft each			1590			1590
Culvert	1		375			375

2 Bridges			$ 400				$ 400
Fence			$ 240				$ 240
			6065 20				6756 80

18*th Mile* continues through flats; soil sandy loam; closes upon the second bank near the end, and becomes gravelly. Estimate, viz:

Excavation	35200 yds at	7 cts	2464	46860 yds at	7 cts	3280 20
Culvert			300			300
Bridges	2		400			400
Fence			240			240
			3404			4220 20

19*th mile* passes round a bluff bank, with terrace and slope wall 400 yards, then deep cutting the same distance, from 23 to 12 feet above water; small embankment at Daniel Hornbeck's, and then flats to the end; soil, sandy and sandy loam—very easy. Estimate, viz.

Excavation, including terrace	117,940 yds at	8 cts	9435 20	133,360 yds at	8 cts	10668 80
Embankment	3940	10	394			394
Slope wall outside, sq yds	5660	60	3396			3396
do inside	7200	20	1440			1440
Puddle, c yds	1800	25	450	2200		650
Culvert	8 feet		650			650
2 Bridges			400			400
Fence			160			160
			16325 20			17658 80

20*th mile.* Ground on part of the distance slightly rolling; soil, light loam. Estimate, viz.

Excavation	24030 yds at	7 cts	1682 80	30280 yds at	7 cts	2119 60
Embankment	10800	12	1296	10800	12	1296

	Small Canal.		Large Canal.	
2 Culverts		$ 750		$ 750
2 Bridges		400		400
Fence		240		240
		43 8 80		1805 60
21*st Mile* Passes on to the wheat plains—fine arable flats—Lock No. 7 near the end			Sandy loam, very [illegible]v.—	
Estimate viz.—Excavation	29800 yards at cents 2[illegible]		39600 yards at 7 cents	2772
Lock No. 7	9 feet $ 496	44 4	9 feet $ 576	5984
Culvert		300		3 0
2 Bridges		400		400
Fence		240		240
		7490		8896
22*d Mile*, Continuation of the wheat plains—soil as before—Lock No. 8 near the beginning.—Estimate viz:				
Excavation	35560 yards at 7 cents	2489 20	44740 yards at 7 cents	3131 80
Lock No. 8	9 feet $ 496	4464	$ 576	5184
2 Bridges		400		400
Fence		2 0		240
		7593 20		8956 80
23*d Mile*. Flats generally of the same character except narrower on the first part—Soil sandy loam and gravel—				
Estimate. viz:—Excavation	36200 yards at 8 cents	2896	48680 yards at 8 cents	3894 40
Culvert at Tom's creek		730		730
1 Bridge		200		200
Fence and 200 yards light grubbing		300		300
		4126		5124 40

24th Mile. Flats to 360 yards from the end—the line then closes to the up-slope on the line of the present road. Soil sandy loam, except at the end, which is indurated clay and soil.—Estimate, viz:

Excavation and slight terrace	28880 yards at 7 cents	2021 60	3 560 yds at 7 cents	2099	20
Culvert	3 feet	75		375	
Bridge	1	200		200	
Road new formed	48 per $8	384		384	
Fence		240		240	
		3 660 0		3878	20

25th Mile Continues near foot of up-slope, and in part on the line of the present road to 350 yards from the end. Flat barely sufficient for the canal on part of the distance—wider near the end. Sandy loam and indurated clay. Estimate, viz:

Excavation	29529 yards at 8 cents	2261 60	35100 yards at 8 cents	2808	
Culverts one of 6 feet and one small		700		700	
Bridge		200		200	
Road new formed	100 per $8	800		800	
Fence ½		120		120	
		4181 60		4628	

26th Mile Passes through fine flats to the crossing of Bushkill. Lock No. 9 at the north end of the dam—waste weir of stone, average 12 feet high, 50 yards long in five sections. Embankment 330 yards, running 240 on to the next mile. Estimate, viz:

Excavation	25080 yards at 7 cents	1755 60	33120 yards at 7 cents	2318	40
Embankment at the south wing of the dam	13200 13	1716		1716	
Slope wall inside and out sq yds	4160 40	1664		1664	
Waste weir, viz. masonry	720 per $3	2160		2160	
Dry wall	380 1 25	475		475	
Filling in	560 yds 15	84		84	

	Small Canal.			Large Canal.		
Sheeting tow bridge, apron, &c.			1120			1120
Lock No. 9	9 feet S 496		4464	8576		5184
2 Bridges			400			400
Fence			200			200
			14068 60			15321 40

27th Mile. From the guard lock at the Bushkill dam 610 yards to the beginning of Greenland, ground not unfavorable, then steep rocky sideling to the entrance of the tunnel 640 yards—Tunnel 266 yards long—Rocks, limestone and slate. Estimate, viz:

Excavation, earth	9600 yds at 9 cts		864	12180 yds at 9 cts		1096 20
Embankment, earth	1800	12	216	1800	12	216
Embankment, earth and stone	67200	20	13440	80640	20	16128
Slope wall outside	7260	30	2178			2178
do inside	2560	12	307 20			307 20
Puddle	1320	25	330	1760	25	440
Culvert			250			250
Guard lock at the rate of an 8 feet lift			3968			4608
Fence and grubbing			258			258
			21811 20			25481 40
Tunnel excavation 266 yds long	6207 yds at S2 50		15517 50	7094 yds at S2 50		17736
Deep cut on the north side	1125	1	1125	1230	1	1230
Masonry at each end	300 per	3 50	1050	330 per	2 50	1155
Tow path bridge	286 yds	6	1716			1716
			19408 50			21857
			41219 70			47338 40

28*th Mile* Passes nearly in a straight line along the foot of the mountain, on the south side—Deep cut at the mouth of the tunnel, otherwise favorable throughout—Loam and small gravel. Estimate, viz.

Excavation	46200 yds at 8 cents	3696	56400 yds at 8 cts	4512	
Culvert		300		300	
3 Bridges		600		600	
Fence		240		240	
		4836		5652	

29*th Mile* Closes to a steep slope and passes 340 yards on face of limestone bluff with terrace and slope wall, then passes on to the flat with slight extra cutting, partially in rock. The remainder favorable. Estimate viz:

Excavation, earth	27800 yds at 8 cts		2204	36200 yds at 8 cts		2896	
do limestone	3400	50	1700	4620	50	2160	
Terrace	25700	14	3598	30600	14	4284	
Slope wall, sq yds	4080	30	1224			1224	
do inside	1360	12	163			163	
Puddle, c yds	680	25	170	1020		255	
Culvert			250			250	
Bridge			200			200	
Fence			240			240	
			9749			11672	

30*th Mile.* Limestone ledges on the first three hundred yards, the remainder favorable—Soil gravelly loam.—Estimate, viz:

Excavation, earth	25500 yds at 8 cts		2040	35460 yds at 8 cts		2836 80	
do rock	3600	50	1800	4800	50	2400	
2 Culverts of 6 feet	$450		900			900	
Bridge			200			200	

	Small Canal.		Large Canal.	
Fence		$200		$ 200
Roard to be formed anew	40 per. $6	240		240
		5380		6776 80

31*st Mile* Locks down near the beginning, and runs on favorable flats to the end—Soil sandy loam.—Estimate, viz.

Excavation	32120 yds at 8 cts	2569 60	41580 yds at 8 cts	3726 40
Lock No. 10	9½ ft $496	4712	$ 576	5472
Bridge		200		200
Fence		200		200
		7681 60		9198 40

32*d Mile.* Passes wholly through flats of the most favourable character, lock No 11, near the beginning, soil sandy loam. Estimate, viz:

Excavation	30980 yds at 7 cts	21 8 60	39620 yds at 7 cts	2773 40
Lock No. 11	9½ ft, at 496	4712 00	576	5472
Bridges	3	600		600
Fence		240		240
		77 0 60		9085 40

33*d Mile.* Favourable flats to 1260 yds, then bluff bank and terrace to the end, sandy loam, gravelly near the end Estimate, viz:

Excavation	19040 yds at 7 cts	1 32 80	24480 yds at 7 cts	1713 60
Terr ce	39560 9	3560 40	46020 9	4141 80
Slope wall	sqr yds 5500 60	3300		3300

2 Bridges			400				400
Fence three-fourths and 460 yds light grubbing			364				364
			8957 20				9919 40

34th Mile, Continues along the bluff, with narrow strip of flat below the level, 300 yards, then cuts in for half a mile—extreme depth 22 feet above water, then steep sideling with terrace to the end, soil sandy and sandy loam. Estimate, viz:

Excavation	89280 yds at	7 cts	6291 60	104280 yds at	7 cts		7299 60
Slope wall sqr. yds	8800	60	5280		60		5280
Puddle and inside slope	3520	25	880	5280	25		1420
Culverts	2 of 8 feet,		1300				1300
Bridge			200				200
Fence ½ and 800 yds grubbing			560				560
			145 1 60				16059 60

35th Mile, Commences at the base of the up slope, but runs on to the flat at 250 yds and has favourable ground to 1450 yards, then rocky bluff for 200 yds and terminates in flat—Lock No. 12, near beginning, sandy soil. Estimate, viz.

Excavation	34400 yds at	7 cts	2408	40160 yds at	7 cts		2811 20
Terrace	1200	14	1764	14600	14		2044
Slope wall sqr. yds	2200	30	600				660
Puddle and inner slope w.			1400				1440
2 Culverts			700				700
Lock No. 12	9½ ft, 8496		4712	8576			5172
Bridge			200				200
Fence and 250 yds light grubbing			280				280
			11864				13607 20

	Small Canal.			Large Canal.		
56th Mile, Through flats generally favourable, slight extra cutting at Eylenberger's, crosses Vancamp's creek sandy loam, Estimate, viz:						
Excavation	30580 yds at 7 cts		2140 60	39320 yds at 7 cts		2752 40
Slope wall at the dam of Vancamp's creek	400	15	60			60
Waste weir	30 ft breast		260			260
8 bridges			700			700
Fence			240			240
			3400 60			4012 40
57th Mile, Passes 525 yds of bluff of which 225 are rocky, the residue in flats and very favourable. Estimate. viz:						
Excavation	23360 yds at 7 cts		1635 20	26970 yds at 7 cts		1887 90
Terrace	20260	15	3039	24400	15	3660
Slope wall	2500	30	750			750
2 culverts			700			700
2 bridges			400			400
Fence $\frac{2}{3}$ and four hundred yards light grubbing			320			320
			6844 20			7717 90
58th Mile, 270 yards bluff, then flats to the crossing of Broadhead's creek, which requires a wooden aqueduct 240 feet long in 6 bays, then 250 yards embankment to the higher flats which are favourable on the remainder. This section includes also a dam across Broadheads creek, above the aqueduct and 400 yards of feeder. Estimate, viz:						
Excavation and terrace	29280 yds at	8 cts	2342 40	37920 yds at	8 cts	3033 60
Embankment	16,800 yds at	12 cts	2016	16800 yds at	10 cts	2016
Slope wall for the terrace and embank.	6720 yds at	60 cts	4032	6720 yds at	60 cts	4032
Aqueduct 6 bays 40 feet each	240 ft		5035			5385

Dam 240 feet waste abutments, sluice, feed gate, &c.			3240			3240	
3 bridges			700			700	
Fence ¾ and 300 yards light grubbing			300			300	
			17,665	40		18,706	60

39*th Mile* Crosses Cherry creek and winds round the face of a rocky hill 250 yds, then 200 yds easy digging to the entrance of the water gap, through which the line continues with terrace and slope wall to the end—Lock No. 13, at the entrance of the water gap. Estimate, viz:

Excavation in earth	14,700 yds at	8 cts	1176		17,170 yds at	8 cts	1373 60
Do lime stone	8330 yds at	50 cts	4165		10.090 yds at	50 cts	5045
Embankment	6600 yds at	12 cts	792		6600 yds at	12 cts	792
Terrace	28000 yds at	25 cts	7000		35,200 yds at	25 cts	8800
Slope wall outside, square yard	8360 yds at	30 cts	2508		8360 yds at	30 cts	2508
Do inside	5440 yds at	12 cts	650	80			650 80
Puddle, cubic yards	1760 yds at	25 cts	440		2640 yds at	25 cts	660
Culverts at Cherry creek	30 ft span		2886				3132
Do at Dutot's tail race	8 ft		760				760
Lock No. 13	9½ ft		4712				5472
3 bridges			600				600
Fence ¾ and 300 yds light grubbing			280				280
			25,969	80			39073 40

40*th Mile*, Continues through the gap, to 70 yards from the end, soil chiefly loose rocks and earth. Estimate, viz:

Terrace	38440 yds at	20 cts	7688		51450 yds at	20 cts	10290
Puddle	3520	25	880		5280	25	1320
Slope wall outside sq yds	19360	30	5808				5808
do inside	5280	12	633	60			633 60

	Small Canal.			Large Canal.		
Culvert			$ 300			$300
Grubbing, lightly on fifteen hundred yards			600			600
			15909 60			18951 60

41*st Mile*, Leaves the gap, at 70 yards, then slight extra cutting on 700, remainder generally favourable, sideling near the end, soil sandy loam. Estimate, viz:

Excavation			50100 yds	at 8 cts	4008	63600 yds	at 8 cts	5088
Terrace			2100	20	420	2800	20	560
Slope wall	outside	sq yds	3300	30	990			990
do	inside		1800	12	216			216
2 culverts					900			900
Bridge					200			200
Road renewed			140 p	$7	980			980
					7764			8924

42*d Mile*, Runs on sidelings requiring slope wall in part to 800 yds, the remainder flats, soil clay and gravel on the first part, sandy loam on the last. Estimate, viz:

Excavation			34240 yds	at 8 cts	2739 20	46080 yds	at 8 cts	3686 40
Slope wall	sq yds		6800	50	3400			3400
Culvert at Slate Quarry creek and 1 small one					1150			1150
2 bridges					600			600
Fence $\frac{2}{3}$ and 400 yards light grubbing					320			320
					8209 20			9156 40

43*d Mile*, Twelve hundred yards intervale, the remainder side hill intersected with ravines—Lock No. 14, near the end, sandy loam on the first part, stoney towards the end—Estimate, viz.

Excavation	33,620 yds at	8 cts	2689 60	43,330 yds at	8 cts	3482 40
3 culverts			1050			1050
Lock No. 14	9½ ft 8496		4712	8576		5472
4 bridges			900			900
Fence and 500 yards light grubbing			420			420
			9771 60			11,324 40

44*th Mile*, Passes for nine hundred yards at base of the up slope, requiring slope wall in part, then flats—embankment and culvert on Kobses' kill. Soil gravelly. Estimate, viz:

Excavation	21,240 yds at	8 cts	1699 20	27,780 yds at	8 cts	2322 40
Embankment	15,300	12	1836	15,300	12	1836
Slope wall	3520	60	2112			2112
Culvert at Kobeses' kill	24 ft		1940			2180
Ordinary culverts			450			450
3 bridges			650			950
Fences ½ and 100 yards light grubbing			160			160
Road renewed	40 p		280			280
			9127 20			9898 40

45*th Mile*, Runs on the line of lowest ground west of Hageman's, and near the foot of the up slope—extreme depth of cutting 9 feet above water—soil, clay and gravel. Estimate, viz.

Excavation	77500 yds at	9 cts	9750	94,600 yds at	9 cts	8514
3 bridges			700			700
Fence			240			240
			7915			9454

	Small Canal.		Large Canal.	
46th Mile, Ordinary cutting and favorable ground throughout—soil, part sandy, part clay and gravel. Estimate, viz.				
Excavation	31,080 yds at 8 cts	2486 40	41,960 yds at 8 cts	3356 80
2 culverts		750		750
1 bridge		200		200
Fence $\frac{2}{3}$ and 200 yards light grubbing		240		240
		3676 40		4546 80
47th Mile, Ground rather rolling on the first half mile. Locks No. 15 and 16, nearJ. Auter's. Remainder very favorable—soil, clay and gravel on the first part, sandy loam on the last Estimate, viz.				
Excavation	44,360 yds at 8 cts	3648 80	54,060 yds at 8 cts	4324 80
Locks No 15 and 16	19 ft $496	9424	19 ft $576	10,944
3 bridges		650		650
Fences $\frac{2}{3}$ and 200 yards light grubbing		260		260
		13,982 80		16178 80
48th Mile, Very favorable flats—soil light sandy loam. Estimate, viz.				
Excavation	32,200 yds at 7 cts	2254	40,250 yds at 7 cts	2817 50
Embankment	5500 yds at 12 cts	660		660
Culvert		450		450
2 bridges		400		400
Fence		240		240
		4004		4567 50

49th Mile, Closes upon steep second bank and runs sideling on the chief part of the distance four hundred yards requiring slope wall. Lock No. 17, at the beginning—soil inclining to gravelly, easy digging. Estimate, viz.

Excavation	51,140 yds at	8 cts	4091 20	60,380 yds at	8 cts	4830 40
Slope wall square yards	4400 yds at	60 cts	2640	4400 yds at	60 cts	2640
Culverts, one of six feet and two small			950			950
Lock No 17	9 ft $496		4464	$576		5184
3 bridges			700			700
Fence ⅔ and 500 yards light grubbing			360			360
			13,205 20			14,664 40

50th Mile, Favorable flats to 1100 yards, then a steep gravelly bluff to the end. Lock No. 18, at the beginning of the terrace. Estimate, viz.

Excavation and terrace	62000 yds at 9		5580	70620 yards at 9 cts.		6895 80
Slope wall square yards	7260	60	4356			4356
Lock No. 18	9 ft $496		4484	$578		5184
Culvert			250			250
2 Bridges			400			400
Fence ⅔ and 200 light grubbing			240			240
			15290			17325 80

51st Mile, Two hundred yards, as the preceding, then slight extra cutting and favorable flats to the end except seventy yards which run upon cave bank. Estimate, viz.

Excavation and terrace	44760 yds at 8 cts		3580 80	56800 yards at 8 cts		4568
Embankment	11100	12	1332	12720	12	1526 40
Slope wall square yard	2500	60	1500			1500
Do	1000	30	300			300
Culverts 1 of 10 feet 2 of 5 feet			1625			1625
3 Bridges			600			600
Fence ⅔ and 200 yds light grubbing			260			260
			9197 80			10379 40

	Small Canal.			Large Canal.		
52d Mile, Passes along the face of the ledge at long rift, with terrace and slope wall to the end. Estimate, viz.						
Terrace and embankment	123200 yards at 10 cts		12320	142180 yards at 10 cts		14218
Slope wall square wall sq yds	18700	30	5610			5610
Culvert			650			650
Bridge			200			200
Slight grubbing			160			160
			18940			20838
53d Mile, Slight terrace at the beginning, then flats half a mile, then face of second bank to the end—cuts in slightly near the end—soil gravelly, stony near the end. Estimate, viz.						
Excavation	40920 yds at 9 cts		3682	49720 yds at 9 cts		4474 80
3 Bridges			800			800
Fence			220			220
			4702			5494 80
54th Mile Has choice of levels and easy digging to two hundred and twenty yards from the end, where the limestone ledges of Foul rift commence, and run to 12 feet above water at the end. Channel to be cut without slopes. Estimate, viz.:						
Excavation in earth	22440 yds at 8 cts		1795 20	26840 yds at 8 cts		2147 20
do in rock	7040	50	3520	8800	50	4400
Culvert			250			250
Bridge			500			500
Fence and 660 yds light grubbing			424			424
			6489 20			7721 20

55th Mile. Limestone ledge to four hundred yards; extreme depth 12 feet above water, occasional ledges on the four hundred following. Line then descends by locks No. 19 and 20, and runs on flat with easy digging to the end. Lock No. 21 in the flat Estimate, viz:

Excavation in rock	14480 yds at 50 cts	7240		18820 yds at 50 cts	9410
do in earth	23600 8	1888		30100 8 cts	2408
Locks No. 19, 20, 21	27 ft $4696	13392		$5670	15552
Bridge		200			200
Fence ⅔ and six hundred yards slight grubbing		400			400
		23120			27970

56th Mile, Through flats, very favorable. Lock No 22 at five hundred yards. Soil sandy loam. Estimate viz.

Excavation	26640 yds at 7 cts	1864 80		32860 yds at 7 cts	2300 20
Embankment	5400 10	540		5640 10	564
Culvert	8 feet	650			650
Lock No 22	9 $496	4464		$576	5184
2 bridges		400			400
Fence		240			240
		8158 80			$9338 20

57th Mile Passes face of an iron bank three hundred yards, requiring terrace, then two hundred yards in flat, then eight hundred yards—steep slope requiring terrace, of which 450 rocky—the remainder flats. Estimate, viz.

Excavation and terrace		34660 yds at 9 cts	3119 40		40380 yds at 9 cts	3634 20
do	stony	21700 12	2604		26350 12	3162
do	rock	2860 50	1430		3740 50	1870
Slope wall	square yards	15180 40	6072			6072
do	inside	4140 15	621			621
Culvert			250			250
2 bridges			400			400
Fence ¼			60			60
			14556 40			16069 20

	Small Canal.			Large Canal.	
58th Mile. Very favorable ground to four hundred and forty yds from the end, then commences a gravelly bluff, requiring terrace, &c. Lock No. 23 at commencement of slope wall—soil clay and gravel. Estimate, viz.					
Excavation and terrace	52900 yds at 9 cts		4761	64860 yds at 9 cts	5837 40
Slope wall square yards	4840	60	2904		2904
2 culverts			700		700
Lock No. 23	9 feet		4164		5184
2 bridges			400		400
Fence ¾			180		180
			$13409		$15205 40
59th Mile. Bluff continues six hundred and sixty yards, the line then cuts in and runs on favorable flats to the end. Gravel'y and sandy loam. Estimate, viz.					
Excavation and terrace	7528 ½ yds at 8 cts		6022 40	9000 yds at 8 cts	7208
Slope wall	7360	60	4416		4416
2 culverts			600		600
Bridges			200		200
Fence and light grubbing			220		220
			11458 40		12644
60th Mile Flat continues favorable one hundred and twenty yards, then rock cutting round face of steep slope three hundred and thirty yards, and part rock one hundred and fifty further to Martin's creek. Moderate embankment between Martin's creek and Howel's tail race, after which flats to No. 24—sideling below the lock, and small portion of rock near the end. Estimate, viz.					
Excavation earth	16920 yds at	8 cts	1353 60	21770 yds at 8 cts	1717 60
do rock	11956	40	4782 40	15542 40	6216 80
Embankment	14080	12	1689 60	14080	1689 60
Rough wall at the rock sideling	380 per 1	50	570		570

Aqueduct at Martin's creek, 3 arches,	20 ft	3772			4264
Culvert at Howel's tail race		750			750
Lock No. 24	9	4464			5184
4 bridges		1100			1100
Fence and three hundred yds very light grubbing		250			250
Road new formed	40 perch at $8	320			520
		19051 60			22062

61*st Mile.* Through flats with favorable levels, and easy soil. Culvert and embankment at Sandt's. Estimate, viz.

Excavation	39160 yds at 7 cts	2741 20	51340 yds at 7 cts		3593 80
Culvert at Sandt's	12 ft	1090			1244
2 bridges		400			400
Fence		240			240
		4471 20			5477 80

62*d Mile.* Favorable on the first half mile, passing back of Sandt's, line then crosses to the upland with points of rock—Lock No. 25 at the commencement of the steep below which terrace and slope wall are partially required. sandy loam and gravel Estimate, viz.

Excavation earth	18020 yds at	8 cts	1441 60	22240 yds at	8 cts	1779 20	
do rock	5780	40	2312	7050	40	2820	
Terrace	20600	10	2060	24720	10	2472	
Slope wall square yards	4400	30	1320			1320	
Culvert			300			300	
Lock No. 25	9 feet 490		4464	[576		5184	
2 bridges			500			500	
Fence ½ and five hundred yards light grubbing			320			320	
Road new formed	100 per	9	900			900	
			13617 60			15595 20	

		Small Canal.			Large Canal.		
63d Mile. Steep bank continues, with points of rock, to four hundred and forty yards from the end, requiring terrace, &c. remainder favorable levels and easy soil. Estimate, viz.							
Excavation and terrace		61600 yds at 10 cts		6160	78320 yds at 10 cts		7832
Slope wall	sq yds	14520	30	4356			4356
2 bridges				400			400
Fence ½ and twelve hundred yds light grubbing				550			550
				11466			13138
64th Mile, Passes on favorable ground to lock No. 26, then descends by three locks into the head of the Delaware basin, at the point of the Wygaat mountain—remainder of the mile. six hundred yards, to be terraced with tow path only. Estimate, viz.							
Excavation		27240 yds at 9 cts		2451 60	34380 yds at 9 cts		3094 20
Terrace		9300	15	1395	9300		1395
Slope wall	sq yds	4700		1880			1880
Tow path bridge				120			120
Locks No. 26, 27 and 28		26 feet 8496		12896	8576		14976
3 bridges				600			600
Fence ¾				180			180
				19502 60			22245 20
65th Mile. Tow path and slope wall—shore generally favorable. Estimate, viz.							
Terrace		20640 yds at 8 cts		1857 60	20640 yds at 8 cts		1857 60
Slope wall	sq yards	14000	40	5600	20640	8	5600
Tow path bridge				130			150
				7587 60			6587 60

66th Mile. Tow path and slope wall, generally favorable—crosses Bushkill. Estimate, viz.

Terrace	21200 yds at 9 cts		1908		1908
Slope wall sq yards	13860	40	5544		5544
Tow bridge across the Bushkill	180 ft	5 20	936		936
			8388		8388

Fractional remainder from the end of 66th mile to the mouth of the Lehigh, 126 rod s, passing under Delaware bridge, 330 yards opposite the town of Easton, done with piers and bridges. Estimate, viz.

Terrace	6470 yds at 9 cts		582 30		582 30
Slope wall sq yds	3460	60	2076		2076
Tow bridge	990 ft	$5 20	5148		5148
			7806 30		7806 30

Summary of the preceding estimates.

	S. Canal	L. Canal		S. Canal.	L. Canal.
Dam at Peter's Rift	11335	11335	12th	14692	16412 40
1st mile, Lock No. 1	14796 30	17369 80	13th	7437 50	9269
2nd	4824 80	5300	14th	6275 60	7459 60
3nd	3304 50	4000 20	15th	8900 30	9852 30
4th	9516	10754	16th Lock No. 6	8282	9882 30
5th Lock No. 2	8688 40	10194	17th	6065 20	6756 80
6th Lock No 3	8473 20	9463 20	18th	3404	4220 20
6th	21620	24452	19th	16325 20	17658 80
8th	4927 20	5554 40	20th	4568 80	4805 60
9th	3815 60	4372 80	21st Lock No. 7	7490	8896
10th Locks No. 4 and 5	16075 60	18493 60	22nd Lock No. 8	7593 20	8955 80
11th	16794 40	18218 40	23d	4126	5124 40

	S. Canal.	L. Canal.
24th	3200 60	3878 20
25th	4181 60	4628
26th Lock No 9	14033 60	15321 40
27th	41219 70	47338 40
28th	4836	5652
29th	9749	11672
30th	5380	6776 80
31st Lock No. 10	7681 60	9198 40
32nd 11	7720 60	9085 40
33d	8957 20	9919 40
34th	14511 60	16059 60
35th mile Lock No 12	11264	13607 20
36th	3400 60	4012 40
37th	6844 20	7717 80
38th	17665 40	18706 60
39th Lock No 13	25969 80	30073 40
40th	15909 60	18951 60
41st	7714	8924
42d	8209 20	9156 40
43d Lock No. 14	9771 60	11324 40
44th	9127 20	9890 40
45th	7915	9454
46th	3676 40	4576 80
47th Locks No. 15 and 16	13982 80	16178 80
48th	4004	4567 50
49th Lock No. 17	13215 20	14664 40
50th 18	15290	17325 80
51st	9197 80	10379 40
52nd	18840	20838
53d	4702	5494 80
54th	6489 20	7721 20
55th Locks No 19, 20 and 21	23120	27976
56th No 22	8158 80	9338 20
57th	14556 40	16069 20
58th Lock No. 23	13109	15205 40
59th	11458 40	12644
60th Lock No. 24	19051 60	22062
61st	4471 20	5477 80
62nd Lock No. 25	13617 60	15595 20
63d	11465	13138
64th Locks No. 26, 27 and 28	19502 60	22245 20
65th	7587 60	7587 60
66th	8388	8388
Fraction $\frac{4}{10}$ of a mile	7806 30	7806 30
	716.798 80	825,502 10
Engineering, superintendance and contingencies	60000	60000
Total cost for 64 $\frac{6}{10}$ miles,	776,798 80	885,502 10
Cost per mile	$ 11,678 64	$13,319 62

Estimate *round the bend at Walpack*, beginning at the north end of the tunnel, and ending with the 28th mile of the located line. Rocky bluffs 880 yards, then slight embankment, and flats generally to the end—gravelly and sandy loam. Distance 4340 yards. Estimate, viz:

Excavation	70100	yds at 8 cts	5608	97740	yds at 8 cts	7819	20
Embankment	8000	12	960	9400	12	1128	
Terrace along the mountain	91100	20	18220	108320	20	21664	
Slope wall sq yds	10190	30	3057			3057	
Puddle c yds	1700	25	425	2550		637	50
2 Culverts			600			600	
4 Bridges			900			900	
Fence and slight grubbing			540			540	
Comparison { Total distance *round* 4340 yds; Cost for small C.			30210	Cost for large canal		36345	70
do by the *tunnel* 2026	do	do	24244 50	do	do	27509	
Difference in favor of the latter 2313 yds			5965 50			8836	70

Estimate for a separate canal from the Wygaat to Easton.

64*th Mile* runs on favourable ground with ordinary cutting, 1140 yards to lock No. 26, thence turns round the point of the Wygaat with terrace and slops wall. Estimate, viz:

Excavation in earth	21560	yards at 8 cents	1724 80	26120	yards at 8 cents	2089	60
Terrace round the mountain	46600	20	9320	54700	20	10940	
Slope wall	6600	30	1980			1980	
Culvert			300			300	
Lock No 26	9 ft	4 96	4464			5184	
Bridges	3		600	576		600	
Fence $\frac{2}{3}$ 400 yards slight grubbing			240			240	
			18628 80			21333	60

	Small Canal.			Large Canal.		
65th Mile, near the river bank but without exposure, except 500; mixture of rock on this part, otherwise sandy loam, Estimate. viz:						
Excavation	51080 yards at 8 cents		4086 40	66080 yards at 8 cents		5286 40
Terrace	15750	15	2362 50	18750	12	2312 50
Slope wall	5280	30	1584			1584
Culverts			550			550
Bridges			400			400
Fence ¼ and 500 yards light grubbing			320			320
			9802 90			10452 90
66th Mile runs on a flat three hundred and eighty yards, then locks down and keeps the steep slope to the crossing of the Bushkill, and ends one hundred and ten yards further south. Stony along the slope with points of rock. Estimate, viz:						
Excavation	14800 yards at 8 cents		1184	18800 yards at 8 cents		1504
Embankment and terrace	53040	12	6364 80	67860	12	8143 20
Slope wall	13800	30	4140			4140
Aqueduct across Bushkill	5 bays		4750			4750
Lock No. 27	9 ft 496		4464	576		5184
Bridge			200			200
Fence ¼ and 1100 yards light grubbing			500			590
			21602 80			24417 20
Fraction of a mile, one hundred and twenty-six rods from the end of the 66th to the Lehigh, requires strong embankment in front of the town and under Delaware bridge. Lock No. 28 graduates the line to the head line of the lower canal. Estimate, viz:						
Embankment and terrace	45180 yards at 12 cents		5421 60	51600 yards at 12 cents		6192
Slope wall square yards	6960	60	4176			4176

Culvert			350			350
Lock No 28	8 ft	496	3968	576		4608
Bridges	4	350	1400			1400
			15313 60			16726

Comparison of the two modes of construction.

By the Delaware basin.	S. Canal	L. Canal	By separate construction	S. Canal	L Canal
64th mile as above estimated	19,502 60	22,245 20	64th as above	18,628 80	21,333 60
65th	7,587 60	7,587 60	65th	9,302 90	10,452 90
66th	8,388	8,388	66th	21,602 80	24,417 20
Fraction	7,806	7,806	Fraction	15,315 60	16,726
Total	43,284 20	46,026 80		64,850 10	72,929 70
				46,284 20	46,026 80
Difference in favor of the basin location				21,565 90	26,902 90

The instrumental survey upon which the foregoing report is based, was commenced on the thirtieth June, and ended early in August. My assistants were Lieutenant Ross, leveller, Lieutenant T. B.Brown, topographer, Absolem Nyce surveyor, and Lieutenants Chare and French volunteers, to all of whom I am under many and great obligations.

I have the honour to be, &c.

D. B. DOUGLASS.

United States' Military Academy,
29th November, 1828.

No. 1.

Report on the survey of various routes for a portage across the Alleghency Mountains by N. S. Roberts, engineer.

To the Board of Canal Commissioners of Pennsylvania.

GENTLEMEN,

The exploration and location of the route of a rail road across the Allegheny mountain, to connect the canal on the Juniata, with the western division of said canal on the Conemaugh, has among other duties, been assigned to my seperintendance, the present season. Upon the progress made therein, I beg leave to present the following report.

That on the 14th of June, the party for that service left Pittsburg and proceeded by way of Johnstown, to Bob's creek Gap, which had been previously examined and reported to be the most favourable plan. for the intended rail road to pass the Allegheny mountain. As my instructions were very general, and no preference to any route, nor plan of termination of the rail road, having been given, it became necessary after arriving at the summit or gap, above mentioned, and fully examining the same, to take such a topographical view of the mountain, and the principal ranges of hills leading therefrom, in the required direction as would be most likely to admit a continued descending graduation, to extend from said summit, eastward towards the Juniata, and westward down the valley of the Conemaugh. For this purpose several ridges were examined from the mountain east, down each side of the valley of Poplar-run (which has its sources within two miles of said summit,) viewing the different elevations and slopes, and the exposures of the hills, the ravines and depressions to be met, in each route from the summit to the Juniata.

From these views three ranges of hills seemed to present routes, which might be pursued with success, viz: the ridge on the north side of Poplar run, the ridge on the north side of the south branch of the same run, and also the ridge on the south side of the same.

As writers on the subject of locating rail roads have recommended a southern exposure for obvious reasons, other advantages being equal, for the same reasons I have preferred the two first mentioned routes: both of which have been graded, and upon examination, the ridge first mentioned, has decidedly the preference; as the second route will not admit a grade of less than two degrees. The distance between Bob's creek summit-bench, and the Juniata basin, as laid down in the report of Messrs White and Olmstead, is 13 miles 72 chains, and the descent 1591.39 feet. Calculations were made and grades run, for an extension of the line by rounding points and ravines; the line run being the hypothenuse of a triangle whose whole length would be equal to the length of the road, and the whole descent equal to the perpendicular of such triangle, taking

proportionate parts of each, at each station. The perpendicular descent being determined as above, it is evident that the hypothenuse or the line of the road will be extended in proportion to the declivity of the graduation permitted to be run. During these operations a lower place in the mountain situated at the head of Sugar run, which is about two miles north of the turnpike road on the summit of the Allegheny mountain, was explored by the Hon. John Blair, and strenuously recommended by him, as deserving a particular examination. Another company was formed for the purpose, and the fact ascertained, that the sugar run summit is 214 feet lower than that of Bob's creek; and the same was reported by letter to the acting canal commissioner who recommended that the practicability of a route for the rail road by the Sugar run summit should be ascertained; to which due attention has been paid. Having two summits to examine from, it became necessary on the 25th of July, to organize two locating parties. Mr. Theophilus Williams, my principal assistant engineer, was to pursue the locations and levels on the Bob's creek routes, and Mr. Levi Williams as surveyor.

The party on the Sugar run gap location was composed of Mr. James Callan as surveyor, and Mr. George R. Eichbaum as sub-assistant engineer, and the levels thus taken by each locating party have been compared from time to time, at the end of long lines, and found to be very correct.

While these examinations were in progress, another route was recommended. A petition was handed me accompanied by several respectable gentlemen, requesting that a route might be explored from Bob's creek summit by the south side of the Blue Knob mountain, to connect with a basin near the mouth of M'Kee's gap. This was also approved by the acting canal commissioner, and the location and survey has been made, and the route found practicable.

But as a more detailed account of all the graded lines which have been run, and of the number of hands employed from time to time, during the operations, has been communicated from time to time, by letters to Gen. Lacock, the acting canal commissioner on this division, it may not be necessary here to recapitulate them.

As the different routes from the two summits approached the Juniata, it became necessary to examine such situations as appeared favourable for a suitable termination of rail road. And after spending some time in viewing different scites for a basin on the Juniata; I came to the following conclusion, that the site as recommended by Messrs. White and Olmsted, being situated about three fourths of a mile from the turnpike road, and having no particular public advantages; and is about the same distance above the junction of the Blairs gap, or Beaver dam branch, and Bedford branch of the Juniata; and as both these branches are to be brought as feeders through the basin into the canal, two dams, two guard gates, two waste weirs, and two feeders of considerable length will be required for that purpose.

With due respect, however, to the opinion of others, I would recommend a location for a basin which is situated one mile down the Juniata from the above mentioned, and adjoining Frankstown. This location presents ground very favorable for a spacious basin, which may be extended up from Frankstown, about half a mile at a moderate expense, and as the turnpike road is perfectly straight for that distance, the basin proposed is laid parallel thereto, and 100 feet from it, and 108 feet wide at the water surface. The ground adjoining the basin and turnpike road, will afford space sufficient for a convenient and extensive town; and besides the more local advantages to be derived by a respectable neighboring population; its being situated on one of the most public turnpike roads in the state, and likewise at a point where several other leading roads diverge in different directions, will afford extensive commercial accommodations to a very considerable distance in the surrounding country; all which, together with the beauty of the situation would tend to increase the prosperity of a flourishing town. To bring the water into the head of this proposed basin, to supply the canal, but one short feeder, one guard gate, and one dam, (five feet high) and one waste weir to be situated just below the junction of the two branches, which will discharge the floods into the natural channel of the river, will be necessary. This location would save one mile of canal, on which will be necessary at least one lock, one aqueduct to convey the canal across the Beaver dam branch, and half a mile of considerable embankment to reach the site of the upper basin The rail-road for the same distance can be made for less money. All the routes from the Sugar run gap, and from Bob's creek gap by way of Newry, terminate very conveniently at the Frankstown basin.

If the route for a rail road by the south side of the Blue Knob should be preferred, the site of the proposed basin as located opposite the mouth of Makee's Gap, presents as many advantages in point of natural beauty and a central position, as almost any other situation which has come within the limits of the contemplated improvement; being situated in the vicinity of a number of extensive iron works and other manufactories, and in the midst of a rich agricultural district, well accommodated with good roads conveying to the point where the basin and rail road are proposed to unite.

In this arrangement a town might be laid out as extensive as should ever be necessary, the basin being located in a wide bottom, near the margin of a hill gently rising to the northwest.

And although there is good reason to believe, that a sufficient supply of water might at all times be furnished, for all the purposes of the canal, from the Bedford and Cove branches united; yet in order to obtain the Cove branch, considerable expense would be incurred, besides the private damages to mill owners, to the amount of four or five thousand dollars, and perhaps more, by diverting the course of that stream. About seven miles of canal and twenty six feet of lockage, would also be necessary between the proposed basin at Frankstown and the Cove basin.

A very convenient location for a basin and feeders has been made on the Juniata, at the mouth of Poplar run, and handsomely connected with the rail road line which passes through Newry. This would require an extension of the canal of four miles, and about 40 feet of lockage, between Frankstown and the basin at the mouth of Poplar run.

The Cove and Bedford branches unite about half a mile above this proposed basin, where the water can be taken by a dam about four feet high, and conveyed to the head of the basin at a very moderate expense, the distance being but 25 chains, and without doing the least injury to private property. With respect to expense, the basin at the mouth of Poplar run has decidedly the advantage over that at the Cove; and in all other respects, may be considered as equally well situated for commercial intercourse, and for a populous town.

Such are the different locations for the union of the rail road and canal, on the Juniata, which I have thought proper to recommend for the consideration of the board.

On the west of the mountain, no point or place for terminating the rail road or canal, has been agreed upon with as much certainty as the public interest requires. Agreeably to the intention of the legislature, to extend the canal on the Juniata and Conemaugh, as high as the supply of water is sufficient, the acting canal commissioner required the engineers of the western division of the canal, to ascertain and recommend such place of terminating the canal on the Conemaugh; which has been attended to, and a report made thereon, agreeably to the said requirements, and the views of the legislature.

But after duly considering the embarrassing and uncertain nature of the circumstances and evidences, under which that estimate of water was made, my duty requires me to explain my views on that subject more fully at this time, to the board. According to the requisition of the acting canal commissioner, an estimate was made of the waters running in the Conemaugh at Johnstown, on the 16th of October, 1828, and found to be more than 40 cubic ft per second; and from the best information received at the time, it had not been much lower through the season, except for a few days. But from the uncertainty of the case, allow a severe drought to reduce the quantity to 20 or 25 cubic feet per second, and that one third of this last quantity is from the south fork, (which is about the quantity found in it by Gen. Lacock by actual measurement, during a very dry time) there would then be running where the Ebensburg and Munster branches, commonly called the North Branch, unites with the Conemaugh 5½ miles above the south fork, at the rate of 15 cubic feet per second. without any preconcerted reservoirs, more than the natural bed of the stream. In order to make the most economical use of water, admit locks of five feet lift to be constructed, and allow the greatest press of business to require six boats to pass up and down, requiring four locks of water every hour, at this rate 144 boats requiring 96 locks of water, would

pass every 24 hours, which being computed thus, 5 × 15 × 90 × 96 gives 648,000 cubic feet, the quantity contained in 96 locks, which being divided by the number of seconds in 24 hours, viz: 24 × 60 × 60=86,400, the quotient is 7½ cubic ft of water per second, which would be necessary to pass 144 boats per day, which, during the drought of summer, would probably never happen as at that season, a recess in canal navigation commonly occurs. The remaining 7½ cubic feet, and allow 7½ cubic feet per second from the same fork, making 15 cubic feet per second, which would supply a loss by soakage and evaporation, at the rate of 50 cubic feet per minute per mile, on 18 miles of canal. This supply would be the more ample, as the loss by leakage would be returned to the canal by means of several dams, composing a part of the canal itself in the above distance, which extends some distance below the junction of Stony creek, and where a feeder would be taken to supply the canal below Johnstown.

Considering the great extent of surface drained by these three branches of the Conemaugh, it is reasonable to state, that a very considerable supply, in addition to the above, might be obtained, if necessary, from suitable reservoirs formed on each of those branches, to be drawn in seasons of drought, and which would form valuable sites for manufacturing purposes. From these views of the subject, there is reason to believe, until facts can be better ascertained, that a sufficient supply of water, for all the purposes of a canal, may at all seasons be relied upon as far up as the junction of the North Branch.

The situation is pleasant and healthy, and for several miles above and below, the hills have considerably subsided, and are partially cultivated, as well as a fine wide bottom of alluvial land, which extends about three miles above and below the mouth of the North Branch, and is principally along the west side of the river, which, for the above distance, flows in a gentle current of less than ten feet to the mile.

A spacious basin might be conveniently located at a suitable distance below the North Branch, and by a low dam across the river just below the junction, the waters of the united branches might be brought by a short feeder through the basin into the canal.

The ground adjoining is suitable for a convenient and extensive town, and roads lead off to Ebensburg and Munster, and in other directions.

Such a situation for the junction of the rail road and canal, would, in all probability, soon become very interesting to the adjacent country.

Should this place as a termination be adopted, about 16 miles of canal, and 380 feet of lockage, would be necessary, to continue the navigation from Johnstown to the North Branch.

The location of the rail road extends to Johnstown, where a suitable basin can be made to connect to the canal. The site of the town is perfectly healthy, and is in every respect, well situated to accommodate the country, as roads lead from it in different direc-

tions, yet the reasons above stated have been considered of sufficient importance, both in a public and private point of view, to require a great degree of prudence in determining upon a final location. And that this subject, together with an account of all the graduations, surveys, locations, estimates and relative opinions which have been made on the various routes, at the present critical stage of the business, should be as fully communicated as the nature of the case will admit, and submitted to the board, to enable them to report thereon, as the merit of the different routes and the public good may require.

The following is a statement of the distances, grades and descents of the several routes, for a rail road, which have been explored and located from Bob's creek summit, and from Sugar run summit east to the Juniata.

First route, from Bob's creek summit along the northerly side of Poplar run, to the proposed basin above Frankstown, beginning at the Cucumber bench on the summit.

Thence to No 400, distance 15 miles at 1° or 92 feet per mile, descent	1380
Thence to No 433, distance 1 mile 20 ch at 64 feet per mile to Newry	80
Thence to No 524, distance 14 miles 58 ch at 24 feet per mile old basin	113.40
Thence to No 554 distance 1 mile 1 ch at $17\frac{6}{10}$ feet per mile to proposed basin	17.90
Length of this route 21 m. 79 ch. Total descent	1591.30

The summit on this route is favorable ground, which continues for some distance along the east side of the mountain; the line passes some steep ground and several cultivated farms, and in about 5 miles the line turns more east, and follows the southerly side and near the top of a ridge which in some parts is quite steep, in others more broad and cultivated, and extends to Newry in $11\frac{1}{4}$ miles, where a lighter grade is pursued along the southerly side of Chinney ridge 2 miles to the Juniata, and thence along the margin of the river and bottom land, mostly cleared, 4 miles to the proposed basin, near Frankstown. This line has a favorable exposure facing to the south and east. It is moderately stony, and the mountainous part has some rock. A branch of this route leads from Newry to the mouth of Poplar run, where a convenient location for a basin and feeder is made near the Juniata.

Distance to Newry on the above route 16 miles 20 chs, descent to Newry	1,460
Distance to proposed basin at Poplar run 1 mile 76 chains grade 48 feet per mile	92
Length of this route to basin 18 m. 16 chs. Descent to basin,	ft. 1,552

Second route, from Bob's creek summit, by the south side of Blue Knob, beginning at the Cucumber bench on the summit.

Thence to No 438, distance 16 miles 34 ch, at 1° or 92 ft per mile, descent			1,511.10
Thence to the head of the proposed basin	12 ch.	descent	4.07
Length of this route	16 miles 46 ch.	descent	1515.17

On this route in about 2½ miles the line crosses the summit between the waters of the North and South Poplar runs, and in two miles further crossing the farm of Mr. Ivory, reaches the side of Blue Knob. Thus far the ground is very favorable, then turning more to the right, the line follows the side of the mountain which in some parts is very steep and rocky. Passing round the mountain, the ground becomes more favorable, though a very crooked line is traced by running a regular grade.

In about eleven miles the grade follows a ridge which leads in a direction towards the Juniata. The line is very crooked and the cross section of the ground pretty steep to within about 2 miles of the termination, when it becomes more favorable, and has less ravines. This line terminates at a proposed basin located on a handsome situation for a town, adjoining the road from Newry to the iron works on the Cove-branch. This is as short a line as a grade of one degree will admit, as the graduation of one degree terminates only 12 chains from the head of the proposed basin. Although this line has a great share of rocky steep ground, and has many short turnings, it might be made a firm dry road, as it has, through its whole distance, a favorable southern and eastern exposure.

These two routes from the Juniata to Bob's creek gap, lead through a part of the country at present quite remote from the great western turnpikes, being situated nearly between them, and on this account the rail road would add immensely to the interests and accommodations, of a respectable population, and probably the road itself would receive a greater amount of business, and be thereby more beneficial to the state, by being thus remotely situated from other great roads.

Rail road routes from Sugar Run Gap, summit east.

Distances, grades and descents, of three routes, which have been explored and located from the summit of Sugar run gap, east, to the proposed basin near Frankstown.

First route, by the north side of Sugar run, having a fine southern exposure.

Beginning at the white oak bench on the summit and running at 1½ degrees or 138 feet per mile to

No. 238, distance 8 miles 74 chains, at 138 ft per mile descent to foot of mountain				1213.8
Thence to No. 253, along bottom		45	75	44.736
Thence to No. 257, to Old Gap branch		12	74	11.617
Thence to No. 280, along bottom		69	40	54.202
Thence to No. 343, Hollidaysburg	2 miles	29	20	47.25
Thence to No 382,	1 m.	37	20	29.25
Thence to No. 400, of proposed basin		54 level to head		.8
Length of this route	15 m.		Descent,	1381.655

Second route, by the north side of the turnpike road.

This route also, after passing the coal banks, has a favorable southern exposure, till the line swings round more northerly with the mountain, where the road will face the east and north east till it reaches the valley of Spencer's run, from thence to Frankstown the ground is very favorable. Beginning at a point No. 18, which is south of the white oak bench, and 36.746 feet above it, in order to cross a ridge near Burgoon's coal bank, and running at one degree,

Thence to No. 353, distance 12 miles 42 chains, at 92 feet per mile,	1152.3
Thence to No. 409, distance 2 miles 11 chains, at 93.30 ft. per mile,	199.481
At this station this line unites with the line by the north side of Sugar run, at No. 293, which stands on the east bank of the Old gap branch of the Juniata, thence to No. 382, distance 3 miles 27 chains, 20 feet per mile, (to point of hill,)	66.75
Thence to No. 400, 54 chains—level to head of basin (nearly,)	.8
Length of this route 18 miles 54 chains.	Descent 1419.281

Between these two routes there is much similarity, each having a share of steep rocky ground. The first would be decidedly the most favorable, except that the first 5¼ miles must be graduated at 1¼ degrees.

Third route, by the south side of the turnpike road.

Beginning at the same point and pursuing the same course as the second route, till it reaches the dividing ridge near the coal banks, and then turning to the right the line crosses the turnpike road about half a mile east of Lemon's tavern. This route has much of a mountainous character, and a great share of unfavorable northern exposure, as the line runs for several miles on steep northern slopes of the mountain, and traverses up and down the steep rocky sides of several deep narrow ravines, which penetrate far into the northern side of the Allegheny ridge, which for several miles places the road in a remote and unfavorable situation to be of much use to the adjoining country, and might be considered a dreary route for a public highway.

From 18 to No. 393, distance 14 miles 5 chains at 1° or 92 feet per mile, to bridge above Duncan's,	1293.75
Thence to No. 463, 2 miles 50 chains, 34.46 feet per mile, along turnpike road	93.667
To the bridge which it crosses and joins the Sugar run line at No. 343, south of Hollidaysburg—thence to No. 382, 1 mile 37 chains, grade 20 feet per mile, (to point of hill,)	29.25
Thence to No. 400, 54 chains, level to head of basin, (nearly,)	.8
Length of this route 18 miles 66 chains. Descent,	1417.466

These three routes commence at a point very much to the north of a direct line, and as much out of the desired direction. Then turning from the beginning, (except the Sugar run route.) to the south-west and south-east, crosses theturnpike road within the first 4 miles in both directions. And the eastern routes, more especially the southerly one, occupies the same neighborhood now accommodated with a turnpike road, and more towards the eastern end, these lines run along the turnpike, and within a few chains of it for about four miles to the termination.

From each of those summits one entire route has been explored, and located on each side of the Conemaugh to Johnstown.

The route from Bob's creek summit is continued on the south east side, and the route from Sugar run summit runs on the same side to the 14½ mile bench, when both lines unite, and the line from sugar run summit crosses to the west side of the Conemaugh, which it pursues to Johnstown. The route from Bob's creek west, commences at the Cucumber bench and is continued 10 miles at a graduation of one degree. A part of the route is winding, and some parts stony and rocky; the slope of the cross section is generally less than 20 degrees. The line faces the northwest and

west, and is on very good ground for a road. Beginning at the summit bench,

Thence 10 miles at a grade of	92 feet per mile	descent	920	feet
Thence 20 chains do	60 feet per mile	do	15	
distance 10 miles, 20 chains to the junction		descent	935	feet

The route from Sugar run summit west, commences at No. 18. as stated in the second and third routes east from said summit. The first 3½ miles of this line is very crooked, by passing in succession the ridges and ravine on the north side of the mountain, which give rise to the head waters of Clearfield river; at the 4 mile tree, the line crosses the turnpike road, and from thence the direction of the line is more favorable to the 14½ mile tree, where it unites with the east line. Though some parts are very winding and other parts stony, the section slope is generally less than 20°. The line faces the north and north-west, and west, and is a tolerable route.

From No 18 to 60 dist.	2 m.	20 c,	grade 12 ft.	per m. descent	27 ft.
Thence to 87	1	1	92		93.15
.95		24 level crossing a ridge			
147 5½ m. ch,	2	3½	92	join 1st line	188.25
Thence to the junct'n	9		50		450
Dist to the junction 14 mile bench,	14	48½ chains	descent to the	14½	feet 758.175

As all the routes from the proposed basins on the Juniata will meet at the above junction, the distance from each of those basins to that junction will stand as follows:

Routes by Bob's Creek Gap.

First route, from the proposed basin at Frankstown, by Newry and the north side of Poplar run, to Bob's creek summit bench,	21 m.	79 c.
Distance from Bob's creek summit bench to the junc.	10 m.	0 c.
Total distance by Newry to the Conemaugh	32 m.	19c.
Second route, from the proposed basin at Poplar run by Newry, and the north side of Poplar run to Bob's creek summit bench,	18 m.	16c.
Distance from Bob's creek summit to the junction,	10 m.	20c.
Total distance by Newry to the Conemaugh,	28 m.	36 c.
Third route from the proposed basin opposite M'Kee's or the Cove gap, by the south side of the Blue Knob, to the bench on Bob's creek summit,	16 m.	46c.
Distance from Bob's creek gap bench to the junction	10 m.	20c.
Total distance by the Blue Knob to the Conemaugh,	26 m.	66c.

Routes by Sugar Run summit.

First route, from the proposed basin near Frankstown, by the north side of Sugar run, to Sugar run summit, 15 miles
Distance from Sugar run summit bench to the junction, 14 miles 40 chains
Total distance by the north side of Sugar run to the Conemaugh, 29 miles 40 chains

Second route, from the proposed basin near Frankstown, by the north side of the turnpike to Sugar run summit, 18 miles 54 chains
Distance from the Sugar run summit No. 18, to the junction bench 14 miles 48½ ch's
Total distance by the north side of the turnpike road to the Conemaugh 33 miles 22½ ch's

Third route, from the proposed basin near Frankstown, by the south side of the turnpike road, to No. 18, near the Sugar run summit, 18 miles 66 chains
Distance from No. 18, near Sugar run summit to the junction bench, 14 miles 48½ chains
Total distance by the south side of the turnpike, by Sugar run summit, to the junction, 33 miles 34½ chains

From the junction of the lines to the proposed basin, at the north branch, the distance common to any route is 1 mile 62 chains. Continuing from the 14½ mile bench, at the junction of the lines, the following grades and distances are ascertained between it and Johnstown.

From the junction to the North Branch grade 10 feet per mile	1 m.	62 ch.	24.85
Thence from the North Branch, grade 30 feet per mile	3	18	25.15
Thence grade 24 feet per mile	3		72
Thence, (across the neck) grade 60 feet per mile	1	22	76.5
Thence grade 24 feet per mile	8	58	209.4
Distance to Johnstown on the W. side, 18 miles, descent			407.9

From the 10¼ mile bench, on the south east side, the grades and distances are as follow, viz.

Thence to No. 307, dist.	1 m.	20 ch.	grade 46 ft per m.	57.50
" 407,	4	40	10	45
" 720,	11	0	24	264
" 773,	2	0	40	80
Thence to the bridge in Johnstown		33	45	18.64
Distance to Johnstown on the east side,		19	13 descent,	465.14

Although it has been deemed necessary to survey and grade a route on each side of the Conemaugh to Johnstown, as a basis to work from, but one route will be necessary on a final location. From the junction of the routes, the west side of the river is the most favorable for a road, for some distance below the south fork. But in order to keep the road in the straightest direction, and on the best ground, it will be necessary to take parts of each line; for by cutting off several peninsulas and by crossing the Conemaugh two or three times on bridges, the road will be much shortened and improved, and great expense will be saved by thus avoiding the vertical rocky precipices, which generally form the boundaries of the river, on the outside of all those deep curves. The distance from the junction of the lines down the Conemaugh to Johnstown, on a final location, will not exceed seventeen and a half miles, and the expense will probably be about equal to the average cost per mile generally.

With this report are presented, a set of maps accurately drawn from the surveys, on which are delineated the routes herein recommended; and the mile benches numbered east and west, from each summit, to the proposed basin, or termination of each route, as referred to in the following estimates.

In the following estimates of the expense of constructing a rail road, the great additional convenience it would be to the public, to have a M'Adamized turnpike road by the side of the rail road, which should have the same grade, and which in no place should exceed one degree, has been considered of sufficient importance to give the road an additional width sufficient for that purpose; and the present surveys and estimates offer sufficient evidence of the practicability and economy, and for recommending this opportunity for making such a road across the Allegheny mountains as has never been made in the United States.

The width sufficient for this purpose is computed at 40 feet between the side drains, and 36 feet of which is to be paved. As all these routes are mostly through thick forests, the following preparations previous to excavation, will be necessary.

Grubbing and clearing the width of the road foundation	40 feet
Chopping and clearing 10 feet on each side of the foundation	20
Chopping down the timber for 100 feet on each side of the road to prevent accidents	200

The quantity of excavation and embankment is computed from the angle of a cross section of the road which has been taken at every station. Where the section slope is less than twenty degrees, the back slope of the excavation is computed at sixty degrees. But where the section slope exceeds twenty degrees, and the ground is firm and rocky, the back cutting slope is supposed to stand nearly perpendicular; and in all cases an excavation of thirty feet wide is computed to be sufficient to make the road forty feet wide, besides a drain or ditch of four feet wide on the upper side to convey the water to the culverts and stone drains, which

are to be placed under the foundation of the road at convenient and proper distances, to keep it firm and dry; and where necessary, a drain is to be excavated on each side for the same purpose. Embankments are computed to have a slope of eighteen inches base to one foot perpendicular, and are allowed in all cases, except where the excavation in the road will fill an embankment within one hundred feet of it.

The bed of the road being properly shaped and prepared, is to be paved with broken stone 16 inches deep and 36 feet wide, the whole to be done on the M'Adamized plan.

Of this width a rail road with double tracks will occupy, viz. 3 feet for an outside walk, 4 feet for each set of tracks, and 5 feet between, then 16 feet and a M'Adamized turnpike by the side of it the remaining 20 feet.

Among the various plans for a rail road, that at the Mauch Chunk coal mines is perhaps the cheapest, and at the same time answers for a very extensive business. It is constructed as follows: The road being prepared, oak sleepers, 7 feet long, are laid across the road, bedded on stone, and level with its surface, and four feet apart, into which are keyed the side rails of white pine, 4 by 6 inches, and 16 feet long, and placed parallel, 3½ feet apart, (which is the width between the wheels of the carriages); on the inner edge of these are plates of rolled iron, 1¾ inches wide by ⅝ inch thick, for the wheels to run upon. A single track thus made cost $3050 per mile.

But a more substantial and durable railway is recommended. Prepare stone supports (or sleepers) about twenty inches square, and about two and a half feet long, with the upper end of each properly cut, and drilled eight inches deep, to receive a wooden plug. Place these stones in four parallel lines, and five feet apart, in a direction of the road, the upper or cut end of each to be level with the pavement of the road. On these, place the side rails of locust timber 6 by 10 inches square, and 15 feet long, to be secured to the stone supports by inch bolts, driven through into the wooden plugs in the stones. Upon the inner edge of these side rails, of each set of tracks, plates of rolled iron, two inches by half an inch, are secured by spikes or screws (counter sunk) once in about three feet—the whole to be done in the best manner.

The following is an estimate of one mile of this description of double tracks, viz:

4224 stone supports, cut, drilled and set, at 70 cents each	2956 80	
141 pieces of locust timber prepared and delivered at 75 cents each	1063 50	
30 tons of iron plates drilled and delivered at $100	3000	
4 tons of bolts made and delivered at $1 50	600	
One ton of spikes do	200	
Amounting (inclusive of workmanship) to		7820 30.

An estimate of the route from Bob's creek gap, by Newry to the proposed basin at Frankstown, beginning at the Cucumber bench.

First Mile.

Grubbing 40 feet wide, 5 acres at $100 per acre	500	
Chopping and clearing 10 feet each side, 2½ acres at 16 dollars,	40	
Chopping down timber, 100 feet each side, 25 acres at 3 dollars per acre,	75	
		$615
15° average slope of cross section.		
Excavation 27912 yards at 15 cents,	4186 80	
Ten stone drains under the foundation of the road at $30	300	
Paving the road 36 feet wide and 16 inches deep, on M'Adam's plan, 10200 perches, at 50 cents	5100	
		$10201 80

Second Mile.

Grubbing, clearing and chopping, preparatory as above	$ 615	
11° average slope of section.		
Excavation 19264 yards at 14 cents	2696 96	
Embankment 1000 yards at 14 cents	140	
One culvert	150	
Nine stone drains at $30	270	
Paving the road 10200 perches, at 50 cents	5100	
		$8971 96

Third Mile.

Grubbing, clearing and chopping, preparatory	615	
19° average slope of section.		
Excavation 37817 yards at 14 cents	5294 38	
Embankment 1500 yards at 14 cents	210	
Two culverts at $150 each	300	
Eight stone drains at $30 each	240	
Paving the road 10200 perches at 40 cents	4080	
		$10739 38

Fourth Mile.

Grubbing, clearing and chopping preparatory	615	
average 19 deg. slope of section.		
Excavation 37817 yards at 18 cents	6807 06	
10 stone drains at $30	300	
Paving the road 10200 perches at 30 cents	3060	
		$10782 06

5th Mile. Passes Long-hollow.

Grubbing, chopping and clearing preparatory, 25 deg. average slope of section.	615	
Excavation 41066 yards at 18 cents	7391 88	
Embankment 3000 yards at 14 cents	420	
One bridge or culvert	400	
Nine stone drains at 30 dollars	270	
Paving the road 10200 perches at 30 cents	3060	
		$12156 88

6th Mile.

Grubbing, clearing and chopping preparatory 23° average slope of section.	615	
Excavation 37252 yards at 18 cts.	6705 36	
Embankment 3000 yards at 14 cts.	420	
2 culverts at $150,	300	
8 stone drains 30,	240	
Paving the road, 10200 perches at 30 cts.	3060	
		$11340 36

7th Mile. Passes Castello's farm.

Grubbing, clearing and chopping, amount 20° average slope of section.	515	
Excavation 40717 yards at 18 cts.	7327 26	
Embankment, 5700 yards at 14 cts.	798	
2 culverts at $150,	300	
8 stone drains, at $30,	240	
Paving the road, 10200 perches at 30 cts.	3060	
		$12240 26

8th Mile.

Grubbing, clearing and chopping 17° average slope of section.	615	
Excavation 32674 yds at 18 cts	5,881 32	
10 stone drains at 30 dollars	300	
Paving the road 10,200 perches at 30 cts	3,060	
		9,856 32

9th Mile.

Grubbing, clearing and chopping 15° average slope of section.	616	
Excavation 35199 cubic yds at 16 cts	5,631 84	
Embankment 6000 yds, at 14 cts	840	
3 culverts at $150	450	
7 stone drains at $30	210	
Paving the road 10200 perches at 40 cts	4,080	
		11,826 84

10th Mile.

Grubbing, clearing and chopping 26° average slope of section.	615	
Excavation 42972 yds at 18 cts	7,734 96	
Embankment 8000 yds at 14 cts	420	
3 culverts at $150	450	
7 stone drains at $30	210	
Paving the road, 10200 perches at 30 cts	3,060	
		12,439 96

11th Mile.

Grubbing, clearing and chopping 18° average slope of section.		
Excavation 35199 yds at 18 cts	6,335 82	
Embankment 1500 yds at 14 cts	210	
One culvert	150	
Nine stone drains	270	
Paving the road 10200 perches at 30 cts	3,060	
		10,640 82

12th Mile.

Grubbing, clearing and chopping 20° average slope of section.	300	
Excavation 40707 cubic yds at 18 cts	7,327 26	
Embankment 6000 cubic yds at 14 cts	840	
4 culverts at $150	600	
6 stone drains at $30	180	
Paving the road 10200 perches at 50 cts	5,100	
		14,347 26

13th Mile.

Grubbing, clearing and chopping 24° slope of section, stony,	200	
Excavation 39 60 yds at 18 cts	7,048 80	
10 stone drains at $30	300	
Paving the road, 10200 perches at 50 cts	5,100	
		12,648 80

14th Mile.

Grubbing, clearing and chopping 20° average slope of section.	300	
Excavation 407 7 yds at 16 cts	6,513 12	
Embankment 3600 yds at 14 cts	504	
2 culverts	350	
8 stone drains at $30	240	
Paving the road 10200 perches at 50 cts	5,100	
		13,007 12

15th Mile, Passing Malone's farm.

Grubbing, clearing and chopping 20° average slope of section.	300	
Excavation 40707 yds at 18 cts	7,327 26	
Embankment 10000 yds at 14 cts	1,400	
3 culverts	500	
7 stone drains	210	
Paving the road 10200 perches at 30 cts	5,100	
		14,837 26

16*th Mile*. 1 mile 17 chains to the bench at Newry.

Grubbing and clearing light, being mostly fields, 8° average slope of section.	50	
Excavation, 1631 8 cubic yards at 10 cts.	1631 80	
Embankment, 8500 at 14 cts.	1190	
1 culvert	150	
9 stone drains,	270	
Paving the road, 12368 perches at 60 cts.	7420 80	
		10712 60

16 Miles, 17 chains distance from Bob's creek bench to Newry.—Total expense, $186,799 62

17*th Mile.*

Grubbing very light, being old fields &c. 6° average slope of section.	20	
Excavation, 9845 cubic yards at 10 cts.	984 50	
Embankment 1000 yards at 14 cts.	140	
1 culvert,	200	
9 stone drains	270	
Paving the road, 10200 perches at 50 cts.	5100	
		$6714 50

18*th Mile.*

Grubbing, clearing and chopping, light 20° average slope of section.	300	
Excavation 40707 yards at 14 cts.	5698 98	
Embankment, 4500 yards at 14 cts.	630	
4 culverts, at $150,	600	
6 stone drains, at $30,	180	
Paving the road 10200 perches at 30 cts.	3060	
		$10468 98

19*th Mile.*

Grubbing, clearing and chopping, light 23° average slope of section.	300	
Excavation, 37252 cubic yards at 15 cts	5587 80	
Embankment, 5100 at 14 cts.	714	
3 culverts	450	
7 stone drains at $30	210	
Paving the road, 10200 perches at 30 cts	3060	
		$10321 80

20th Mile.

Grubbing, clearing, &c. light, part field, 12° average slope of section.	300	
Excavation, 21323 yards at 10 cts.	2132 80	
Embankment, 5000 at 14 cts.	700	
2 culverts	300	
8 stone drains at $30,	240	
Paving the road, 10200 perches at 50 cts.	5100	
		$8772 80

Thence 61 chains to Messrs. White & Olmsted's basin.

Grubbing, clearing and chopping 15° average slope.	200	
Excavation, 21282 yards at 10cts.	2128 20	
8 stone drains	240	
Paving the road, 7778 perches at 50 cts.	3889	
		$6457 20

21st. Mile.—(Over the bottoms to head of basin.)

Average 2½ feet excavation and embankment including side-drains, 19550 yds at 14 cts	2737	
5 stone drains	150	
Stone bridge over the Juniata	500	
Paving the road, 10200 perches at 60 cts.	6120	
		$9507

21 miles 79 chains to Frankstown basin, and expense, $239041 46

An estimate of the expense of the route from Bob's creek gap by way of Newry, to the basin proposed at the mouth of Poplar run.

By the last estimate the distance is 16 miles 17 chains from Bob's creek gap to Newry, and the estimated expense,			$186,799 68
One mile 76 chains all bottom land and improved from Newry to the basin,			
Excavation 22,880 cubic yards at 10 cents		$2288	
Embankment 2000	14	280	
One culvert		200	
Ten stone drains		300	
Paving the road 19,890 perches at 60 cts		11934	
			$15,002
Making the length of this route from Bob's creek gap 18 miles 13 chains to the basin at Poplar run, and the expense			201,801 68

The expense of constructing the road from Bob's creek gap by the south side of the Blue Knob to the basin opposite M'Kee's gap, is stated as follows, viz. Beginning at the Cucumber bench:

1st Mile.

Grubbing, clearing and chopping (heavy) 15° average slope of section.	615		
Excavation 27912 yards at 15 cents	4186 80		
Ten stone drains	300		
Paving the road 10200 perches at 50 cts	5100		
		10,201	80

2d Mile.

Grubbing, clearing and chopping, amount 11° average slope of section.	615		
Excavation 19264 yards at 14 cents	2696 96		
Embankment 1000 14	140		
One culvert	150		
Nine stone drains	270		
Paving the road 10200 perches at 50 cts	5100		
		8971	96

3d Mile.

Grubbing, clearing and chopping, amount 8° average slope of section.	615		
Excavation 13458 yards at 14 cents	1884 12		
Embankment 1000 yds at 14	140		
Ten stone drains	300		
Paving the road 10200 perches at 50 cts	5100		
		8039	12

4th Mile.

Grubbing, chopping and clearing 10° average slope of section.	450		
Excavation 17274 yards at 15 cents	2591 10		
Embankment 2500 14	350		
Ten stone drains	300		
Paving the road 10200 perches at 50 cts	5100		
		8791	10

5th Mile.

Grubbing, clearing and chopping (light) 10° average slope of section.	500		
Excavation 17274 cubic yards at 15 cents	2591 10		
Embankment 2,500 yards at 14 cents	350		
Three culverts	450		
Seven stone drains	210		
Paving the road 10200 perches at 50 cents	5100		
		9201	10

6th Mile.

Grubbing, clearing and chopping, amount		400	
30° average slope.			
Rocky excavation 50892 c. yds at 20 cts		10178	40
Embankment 2000	14	280	
One culvert		150	
Nine stone drains		270	
Paving the road 10200 perches at 30 cents		3060	
			14338 40

7th Mile.

Grubbing, clearing and chopping, thin timber,		400	
30° average slope.			
Rocky excavation 50892 yards at 20 cts		10178	40
Ten stone drains		300	
Paving the road 10200 perches at 30 cents		3060	
			13938 40

8th Mile.

Grubbing, clearing and chopping		400	
10° average slope.			
Rocky excavation 17274 yards at 18 cts		3109	32
Embankment 2000 yards at 14 cents		280	
Ten stone drains		300	
Paving the road 10200 perches at 40 cents		4080	
			8169 32

9th Mile.

Grubbing, clearing and chopping		400	
15° average slope.			
Rocky excavation 17274 cubic yds at 18 cts		3109	32
Embankment 2500	14	350	
Two culverts		300	
Eight stone drains		240	
Paving the road, 10200 perches at 50 cents		5100	
			9499 32

10th Mile.

Grubbing, clearing and chopping, amount		500	
15° average slope.			
Excavation 27912 cubic yards at 15 cents		4186	80
Embankment 4500 cubic yards at 14 cts		630	
One culvert		150	
Nine stone drains		270	
Paving the road 10200 perches at 50 cents		5100	
			10836 80

11th Mile.

Grubbing, chopping and clearing, amount 15° average slope	$300	
Excavation 23447 yards at 15 cents	3517 05	
Embankment 12000 yards at 14 cents	1680	
Three culverts	600	
Paving the road 10200 perches at 50 cents	5100	
		11197 05

12th Mile. Cleared land.

16 deg. average slope.		
Excavation 30238 cubic yards at 15 cents	4535 70	
Embankment 12000 14	1680	
Three culverts	500	
Seven stone drains	210	
Paving the road 10200 perches at 50 cents	5100	
		12025 70

13th Mile.

Grubbing, clearing and chopping, light 23 deg. average slope.	$200	
Excavation, 37252 yards at 18 cents	6,705 36	
Embankment 20,000 yards at 14 cents	2,800	
Two culverts	400	
8 stone drains	240	
Paving the road 10,200 perches at 50 cts	5,100	
		15,445 36

14th Mile.

Grubbing, clearing and chopping 24° average slope.	200	
Excavation 39160 yds at 15 cts	5,874	
Embankment 7000 yds at 14 cts	980	
2 culverts	400	
8 stone drains	240	
Paving the road 10200 perches at 60 cts	6,120	
		13,814

15th Mile.

Grubbing, clearing and chopping (part cleared) 19 deg. average slope.	$00	
Excavation 37817 yds at 15 cts	5,672 55	
Embankment 10000 yds at 14 cts	1,400	
3 culverts	600	
7 stone drains	210	
Paving the road 10200 perches at 60 cts	6,120	
		14,802 55

16*th Mile.*

Grubbing, clearing & chopping (part cleared) 8 deg. average slope,	150	
Excavation 13458 yds at 10 cts	1,345 80	
Embankment 8500 yds at 14 cts	1,190	
3 culverts	500	
7 stone drains	210	
Paving the road 10200 perches at 60 cts	6,120	
		9,515 80
46 chains over bottom land to the head of proposed basin. 8 deg.		
Excavation 7738 cubic yds at 10 cts	773 80	
5 stone drains	150	
Paving road 5865 perches at 60 cts	3,519	
		4,442 80

16 miles 46 chs. and making the expense of this route $182,730 58

Note—It was considered that more or less of walling would be necessary along the steepest parts of each route, but that in such cases the reduced width of the excavation would compensate for laying the wall.

The route by the north side of Sugar run, estimated, beginning at White Oak bench, on the Sugar run summit, and from thence to the basin near Frankstown, viz.

1*st Mile.*

Grubbing, clearing and chopping, heavy, 11° section slope.	615	
Excavation, 19264 yards at 14 cts.	2696 96	
Embankment, 1000 yards at 15 cts.	150	
2 culverts,	300	
6 stone drains	180	
Paving the road 10200 perches at 60 cts	6120	
		$10061 96

2d. *Mile.* Stony.

Grubbing, clearing and chopping, heavy, 13° section slope.	700	
Excavation, 23447 yards at 20 cts,	4689 40	
Embankment, 2000 yards at 15 cts.	300	
16 stone drains, wet ground, at $30	480	
Paving the road, 10200 perches at 30 cts.	3060	
		$9229 49

3*d Mile.* Stony and thick laurel.

Grubbing, chopping and clearing, very heavy 11° section slope.	750	
Excavation, 19264 yards at 20 cts.	3852 80	
Embankment, 2500 yards at 15 cts.	375	
2 culverts	300	
1 bridge or culvert,	400	
8 stone drains,	240	
Paving the road, 10200 perches at 30 cts.	3060	
		$8977 80

4th Mile. Stony.

Grubbing, clearing and chopping, heavy, 10° section slope.	615	
Excavation, 35199 yards at 20 cts.	7039 80	
Embankment, 500 yards at 15 cts.	75	
1 culvert.	150	
10 stone drains.	500	
Paving road, 10200 perches at 30 cts.	3060	
		$11239 80

5th Mile. Stony.

Grubbing, clearing and chopping, middling, 23° section slope.	600	
Excavation 57052 yards at 20 cts.	11410 40	
10 stone drains	500	
Paving the road, 10200 perches, at 30 cts	3060	
		$15870 40

6th Mile. Stony.

Grubbing, clearing and chopping, heavy, 26° section slope.	700	
Excavation, 42972 yards at 18 cts.	7734 96	
Embankment, 600 at 14 cts.	84	
10 stone drains,	500	
Paving the road, 10200 perches at 40 cts.	4080	
		$12898 96

7th Mile.

Grubbing, clearing and chopping, middling, 29° section slope.	600	
Excavation, 40707 yards at 15 cts.	6106 05	
Embankment, 1000 at 15 cts.	150	
10 stone drains,	500	
Paving the road, 10200 perches at 40 cts	4080	
		$11236 05

8th Mile.

Grubbing chopping and clearing (middling) 19° section slope.	500	
Excavation 37817 cubic yards at 15 cents	5672 55	
Embankment 500 15	75	
One culvert	150	
Nine stone drains	270	
Paving the road 10200 perches at 50	5100	
		$11,767 55

9th Mile. Bottom land.

Grubbing, clearing and chopping 6 deg. section slope.	300	
Excavation 9845 cubic yards at 12½ cts	1230 62½	
Embankment 500 12½	62 50	
One culvert	150	
Eight stone drains	240	
Paving road 10200 perches 60	6120	
		$8103 12½

10*th Mile.* Bottom land.

Grubbing and clearing (light)		75	
Level, excavation to raise road,			
Ditching and embanking 8820 yards at 10 cts		882	
One bridge over Old Gap branch		600	
Paving the road 10200 perches	60	6120	
			$7677

11*th Mile.*

Grubbing and clearing (light)		300	
18 deg. section slope.			
Excavation 23447 yards at 14 cents		3282 58	
Embankment 2000	14	280	
Two bridges over Old Gap branch		1200	
Six stone drains		180	
Paving the road 10200 perches at 56 cts		5100	
			$10342 58

12*th Mile.*

Grubbing, chopping and clearing (light)		300	
9 deg. slope of section.			
Excavation 15340 cubic yards at 11 cts		1687 40	
Ten stone drains		300	
Paving the road 10200 perches at	50	5100	
			$7387 40

13*th Mile.* Passes Hollidaysburg.

Grubbing and clearing (light)		200	
10 deg. section slope.			
Excavation 17274 yards at 10 cts		1727 40	
Ten stone drains		800	
Paving the road 10200 perches at 60 cts		6120	
			$8347 40

14*th Mile.*

Grubbing, clearing and chopping (light)		200	
4 deg. section slope.			
Excavation and side drains and ditches 7040 cubic yards at 10 cts		704	
Ten stone drains		800	
Embankment 2000 cubic yards at 14 cts		280	
Paving the road 10200 perches at 60		6120	
			$7604

15*th Mile.* Extends quite to the proposed basin.

Grubbing, clearing and chopping (light)		200	
6 deg. section slope.			
Excavation 9845 cubic yards at 10 cts		984 50	
Embankment 2500	14	350	
Bridge over Brush run		400	
Ten stone drains		300	
Paving the road 10200 perches at 50 cts		5100	
			7334 50

Making the expense of the Sugar run route amount to $147,577 92

The route by the north side of the turnpike road estimate: Beginning at No. 18, on the sugar run summit, and thence by Burgoon's coal bank, and along the northerly side of the turnpike road, thence swings round to the north and northwest into the valley of Spencers run, thence down that valley, until it joins the line from the north side of Sugar run at the 11th mile bench, thence along the sugar run line to the proposed basin at Frankstown.

1st distance, 26 chs. to the mile tree, of the first line.

Grubbing, chopping and clearing, heavy, 10 deg. section slope.	208		
Excavation, 5,614 cubic yds. at 13 cts.	729	82	
3 stone culverts, or small drains,	90		
Paving the road 3,315 perches, at 50 cts.	1,657	50	
			$2,685 32

2nd Mile.

Grubbing, chopping and clearing, heavy, 6 deg. section slope.	615		
Excavation 9,845 cubic yds. at 13 cts.	1,279	85	
Embankment 2,000 cubic yds. at 13 cts.	260		
2 culverts (1 at Cole run,)	300		
8 stone drains,	240		
Paving the road, 10,200 perches at 50 cts.	5,100		
			$7,794 85

3rd Mile. Stony.

Grubbing, chopping and clearing, very heavy, 18 deg section slope.	700		
Excavation 35,199 yds at 15 cts.	5,279	85	
10 stone drains	300		
Paving the road 10,200 perches at 40 cts.	4,080		
			$10,359 85

4th Mile. Stony.

Grubbing, clearing and chopping, very heavy, 20 deg. section slope.	700		
Excavation 40,707 cubic yds. at 15 cts.	6,106	05	
Embankment, 1,000 cubic yds. at 15	150		
3 culverts,	500		
7 stone drains,	210		
Paving the road 10,200 perches at 40 cts.	4,080		
			$11,746 05

5th Mile. Rocky.

Grubbing, chopping and clearing, middling, 26 deg. section slope.	615		
Excavation, 42,972 yds at 20 cts.	8,594	40	
Embankment, 2,000 yds. at 14 cts.	280		
10 stone drains, at 30 cts.	300		
Paving the road 10,200 perches at 50 cts.	5,060		
			$12,849 40

6th Mile. Rocky.		
Grubbing, clearing and chopping, 31 deg. section slope.	615	
Excavation 53,835 cubic yds. at 20 cts.	10,767	
Embankment 2,000 yds. 14 cts.	280	
10 stone drains,	300	
Paving the road 10300 perches at 30 cts.	3060	
		$15,022 00
7th mile. Stony.		
Grubbing, chopping and clearing, heavy, 21 deg. section slope.	615	
Excavation, 34025 cubic yds. at 18 cts.	6024 68	
Embankment, 1500 yds. at 14 cts.	210	
10 stone drains,	300	
Paving the road 10200 perches at 30 cts.	3060	
		$10,209 68
8th Mile.		
Grubbing, chopping and clearing, heavy, 15 deg. section slope.	615	
Excavation 27912 cubic yds at 15 cents	4186 80	
Embankment 2000 at 15 cents	300	
2 culverts	300	
8 stone drains	240	
Paving the road 10200 perches at 30 cts.	3060	
		$8701 80
9th Mile.		
Grubbing, chopping and clearing, (heavy) 16 deg. section slope.	615	
Excavation 30238 cubic yds at 15 cts	4535 70	
Embankment 1000 15	150	
Ten stone drains	300	
Paving the road 10200 perches at 40 cts	4080	
		$9680 70
10th Mile. Stony.		
Grubbing, chopping and clearing 19 deg. section slope.	615	
Excavation 37817 cubic yds at 16 cts	6050 72	
Embankment 1000 15	150	
Ten stone drains	300	
Paving the road 10200 perches 30	3060	
		$10175 72
11th Mile.		
Grubbing, clearing and chopping, 16 deg. section slope.	615	
Excavation 30238 cubic yards at 14 cents	4233 32	
Embankment 1500 14	210	
Ten stone drains	300	
Paving the road 10200 perches at 40	4080	
		$9438 32

12*th Mile.*

Grubbing, clearing and chopping 17 deg. section slope.		615	
Excavation 32674 cubic yards at 14 cents		4574 36	
Embankment 1500	14	210	
Ten stone drains		300	
Paving the road 10200 perches	40	4080	
			$9779 36

13*th Mile.*

Grubbing, chopping and clearing 18 deg. section slope.		615	
Excavation 35199 cubic yards at 15 cents		5279 85	
Embankment 1000	14	140	
Ten stone drains		300	
Paving the road 10200 perches at	40	4080	
			$10414 85

14*th Mile.* Down the valley of Spencer's run.

Grubbing and clearing. ¼ in field bottom	200
Excavation and side ditches 7820 cubic yards at 10 cents	782
Embankment 1000 cubic yards at 14 cents	140
Two culverts	300
Eight stone drains	240
Paving the road 10200 perches at 50 cents	5100
	$6762

At 15*th Mile*, 27 chains. (This joins the 11th mile of the Sugar run line.

Grubbing, &c. in the valley of Spencer's run, mostly cleared	100
Excavation and side ditches 10459 cubic yards at 10 cents	1045 90
Embankment 10000 yards at 14 cents	1400
One small bridge or culvert	200
One bridge over Beaver dam branch of Juniata	400
Six stone drains	180
Paving the road, 13643 perches at 60 cts a per.	8185 80
	$11511 70

16*th Mile.*

Grubbing and clearing, light and thin 9 deg. section slope	300	
Excavation 15340 cubic yds at 11 cts	1,687 40	
10 stone drains	300	
Paving the road 10200 perches at 50 cts	5,100	
		$7,387 40

17*th Mile*, Passes turnpike and Hollidaysburg.

Grubbing and clearing, light 10 deg. section slope.	200	
Excavation 17274 cubic yards at 10	1,727 40	
10 stone drains	300	
Paving the road 10200 perches at 60 cts	6,120	
		$8,347 40

18th Mile.

Grubbing light and scattered	200	
Excavation and ditches 7040 c. yds at 10 cts	704	
Embankment 2000 yards at 14 cts	280	
10 stone drains	300	
Paving the road 10200 perches at 60 cts	6,120	
		$7,604

19th Mile, Extends to the head of the basin.

Grubbing and clearing scattered trees. 6 deg. section slope.	200	
Excavation 9845 cubic yds at 10 cts	984 50	
Embankment 2500 cubic yds at 14 cts	350	
Bridge at Brush run	400	
10 stone drains	300	
Paving the road 10200 perches at 50 cts	5,100	
		$7,334 50

Making the length of the line on the north side of the turnpike 18 miles and 54 chains, and the estimated cost of it amounts to $177,804 90

The route from the Sugar run summit, by the south side of the turnpike road, to the proposed basin at Frankstown, estimated as follows.

Beginning at No. 18 on the Sugar-run summit,
Thence 26 chains to the mile-tree on first line.

Grubbing, chopping and clearing, heavy 10 deg. section slope	$208	
Excavation 5,614 cubic yards at 13 cents	729 82	
Three stone drains	90	
Paving the road 3,315 perches at 50 cents	1,657 50	
		2,685 32

2nd Mile.

Grubbing, chopping and clearing, heavy 10 deg. section slope	$615	
Excavation 17274 cubic yards at 13 cents	2,245 62	
Embankment 1000 cubic yards at 13 cents	130	
Ten stone drains	300	
Paving the road 10200 perches at 50 cents	5,100	
		8,390 62

3d Mile, Stony.

Grubbing, clearing and chopping, heavy 13 deg. section slope	$700	
Excavation 23,447 cubic yards at 15 cents	3,517 05	
Embankment 1,500 c yards at 15 cents	225	
Three culverts	600	
Seven stone drains	210	
Paving the road, 10,200 perches at 40 cents	4,080	
		9,332 05

4th Mile. Stony.

Grubbing, clearing and chopping, heavy 27 deg. section slope.	$700		
Excavation 44808 cubic yards at 18 cents	8,065	44	
Embankment 5,000 c yards at 15 cents	750		
One culvert	200		
Nine stone drains	270		
Paving the road 10,200 perches at 40 cents	4,080		
			14,065 44

5th Mile. Rocky.

Grubbing, clearing and chopping 33 deg. section slope.	$615		
Excavation 57,052 cubic yards at 20 cents	11,410	40	
Ten stone drains	300		
Paving the road 10,200 perches at 30 cents	3,060		
			15,385 40

6th Mile. Stony.

Grubbing, clearing and chopping 31 deg. section slope.	$615		
Excavation 53,835 yards at 20 cents	10,767		
Embankment 7,500 yards at 14 cents	1,050		
Three culverts (1 large)	700		
Seven stone drains	210		
Paving the road 10,200 perches at 30 cents	3,060		
			16,402 00

7th Mile. Stony and rocky.

Grubbing, clearing and chopping 33 deg. slope.	$615		
Excavation 57,052 cubic yards at 20 cents	11,410	40	
Ten stone drains	300		
Paving the road 10,200 perches at 30 cents	3,060		
			15,385 40

8th Mile. Stony and rocky.

Grubbing, clearing and chopping 25 deg. slope.	$615		
Excavation 41,066 cubic yards at 18 cents	7,391	88	
Embankment 5,000 cubic yards at 15 cents	750		
One culvert 12 feet span	300		
Nine stone drains	270		
Paving the road 10,200 perches at 30 cts	3,060		
			12,386 88

9th Mile. Stony.

Grubbing, clearing and chopping 27 deg. slope.	615		
Excavation 44808 cubic yards at 18 cents	8065	44	
10 stone drains	300		
Paving the road 10200 perches at 30 cents	3060		
			$12040 44

10*th Mile.*

Grubbing, clearing and chopping 18 deg. slope.	615	
Excavation 35199 yards at 15 cents	5279 85	
10 stone drains	300	
Paving the road 10200 perches at 30 cents	3060	
		$9254 85

11*th Mile.*

Grubbing, clearing and chopping 19 deg. slope.	615	
Excavation 37817 yards at 15 cents	5672 55	
Blair's run embankment 2000 yds at 15 cts	300	
1 culvert	300	
9 stone drains	270	
Paving the road 10200 perches at 40 cents	4080	
		$11237 55

12*th Mile.*

Grubbing, clearing and chopping 22 deg. slope.	400	
Excavation 35640 yards at 18 cents	6415 20	
Embankment 2500 yards at 15 cents	375	
10 stone drains	300	
Paving the road 10200 perches at 40 cents	4080	
		$11570 20

13*th Mile.*

Grubbing, clearing and chopping 27 deg. slope	615	
Excavation 44808 yards at 18 cents	8065 44	
Embankment 2500 yards at 15 cents	375	
10 stone drains	300	
Paving the road 10200 perches at 30 cents	3060	
		$12415 44

14*th Mile.* Deep cut.

Grubbing, clearing and chopping 15 deg. slope to deep cut.	200	
Excavation 27912 yards at 15 cents	4186 80	
Embankment 3500 yards at 15 cents	525	
1 culvert	200	
9 stone drains	270	
Paving the road 10200 perches at 50 cents	5100	
		$10481 80

15*th Mile.*

Grubbing and clearing, light	100	
6 deg. excavation 9845 yards at 10 cents	984 50	
Embankment 2500 yards at 14 cents	350	
1 bridge near Duncan's	500	
6 stone drains	180	
Paving the road 10200 perches at 60 cents	6120	
		$8284 50

16*th Mile.* Below Duncan's along turnpike.

Grubbing and clearing to widen turnpike	150	
Excavating and levelling turnpike 7820 yards at 10 cents	782	
Embanking at bridge 1500 yards at 14 cents	210	
Bridge below Duncan's	500	
Paving the road 10200 perches at 60 cents	6120	
		$7762

17*th Mile.* Along the turnpike.

Grubbing and clearing to widen the turnpike,	$150	
Cutting down the turnpike near Walker's.		
Excavation 9000 cubic yards at 15 cents	1350	
Paving the road, 10200 perches at 60 cts	6120	
		$7620

Thence 40 chains to the 18 mile bench on the Sugar run line.

Grubbing and to widen the turnpike,	100	
Excavating and ditching 5000 c. yds at 10 cts,	500	
Embanking 3000 14	420	
4 stone drains	120	
Bridge over the Juniata near Hollidaysburg,	1200	
Paving the road, 4845 perches at 60 cts	2907	
		$5247

18*th Mile.*

Grubbing and clearing near the edge of the bottom,	200	
Slope 4 deg.		
Excavation and side drains 7040 c yds at 10 c.	704	
Embankment 2000 14	280	
Ten stone drains	800	
Paving the road, 10200 perches at 60 cts	6100	
		$7604

19*th Mile.* Extends to the head of the basin, (at Lawrie's) near Frankstown.

Grubbing and clearing,	200	
6 deg. section slope.		
Excavation 9845 cubic yards at 10 cts	985 50	
Embankment 2500 14	550	
Bridge over Brush run	400	
Ten stone drains	800	
Paving the road, 10200 perches at 50 cts	5100	
		$7334 50

18 miles 66 chains, distance by south side of turnpike to Frankstown, and the cost, $204,885 59

The route from Rob's creek gap, westward estimated. Beginning at the Cucumber bench on the summit, and thence

1st Mile. Stony.

Grubbing, clearing and chopping (usually heavy) 615 17 deg. section slope.		
Excavation 32674 cubic yds at 16 cts	5,227 84	
Embankment 3000 do do at 14 cts	420	
1 culvert	150	
9 stone drains at $30	270	
Paving the road 10200 perches at 40 cts	4,080	
		$10,762 84

2d mile. Stony.

Grubbing, clearing and chopping 16 deg. slope	615	
Excavation 30238 yards at 16 cents	4838 08	
Embankment 500 yards at 14 cents	70	
1 culvert	150	
9 stone drains	270	
Paving the road 10200 perches at 30 cents	3060	
		$ 9003 08

3d mile.

Grubbing, clearing and chopping (as usual) 12 deg. slope.	615	
Excavation 21323 yards at 16 cents	3411 68	
Embankment 2000 yards at 14 cents	280	
8 culverts	500	
7 stone drains	210	
Paving the road 10200 perches at 30 cents	3060	
		$ 8076 68

4th mile. Stony.

Grubbing, chopping and clearing 21 deg. slope	615	
Excavation 34026 yards at 18 cents	6124 68	
Embankment 1500 yards at 14 cents	210	
1 culvert	100	
9 stone drains	270	
Paving the road 10200 perches at 30 cents	3060	
		$10379 68

5th mile. Rocky.

Grubbing, clearing and chopping (heavy as usual) 615 Average slope 21 deg.		
Excavation 34026 cubic yards at 20 cents	6805 20	
Embankment 3000 cubic yards at 14 cents	420	
2 culverts	200	
9 stone drains	270	
Paving the road 10200 perches at 30 cents	3060	
		$11370 20

6th mile. Stony.

Grubbing, clearing and chopping		615	
Average slope 19 deg.			
Excavation 57817 cubic yards at 18 cents		6807 06	
Embankment 2000	14	420	
1 culvert, large		200	
9 stone drains		270	
Paving the road 10200 perches at 30 cents		3060	
			$11372 06

7th mile. Stony.

Grubbing, clearing and chopping		615	
Average slope 16 deg.			
Excavation 30238 cubic yards at 18 cents		5442 84	
Embankment 5000	14	700	
2 culverts		300	
8 stone drains		240	
Paving the road 10200 perches at 30 cents		3060	
			$10357 84

8th mile. Stony.

Grubbing, clearing and chopping		615	
Average slope 11 deg.			
Excavation 19264 cubic yards at 18 cents		3467 52	
Embankment 9000	14	1260	
1 bridge over Trout run		500	
9 stone drains		270	
Paving the road 10200 cubic yards at 30 cts		3060	
			$9172 52

9th Mile.

Grubbing, clearing and chopping, heavy		615	
average slope 10 deg.			
Excavation 17274 cubic yards at 15 cents		2591 10	
Embankment 1000	14	140	
Two culverts		300	
Eight stone drains		240	
Paving the road 10200 perches	40	4080	
			$7966 10

10¼th Mile. (This corresponds with the 14½ miles on the north line.)

Grubbing, clearing and chopping, heavy		800	
Average slope 10 deg.			
Excavation 21592 cubic yards at 14 cents		3022 88	
Embankment 4000	14	560	
12 stone drains		360	
Paving the road 12750 perches	60	7650	
			$12392 88

Making the length of the Bob's creek route west, to be ten miles twenty chains to the junction of the line near the Conemaugh, and the amount of the estimated cost, $100,853 88

The route from Sugar run summit westward estimated: Beginning at station No. 18 on said summit, and thence.

1st mile.

Grubbing, clearing and chopping, as estimated	615	per mile.
Average slope 8 deg.		
Excavation, 13,458 cubic yds. at 15 cts.	2018 70	
Embankment 300 cubic yds. at 15 cts.	450	
10 stone drains or sluices,	300	
2 culverts, at $ 150	300	
Paving the road, 10200 perches at 50 cts.	5100	
		$ 8783 70

2nd mile.

Grubbing, clearing and chopping,	615	
Average slope 10 deg.		
Excavation, 17274 cubic yds. at 14 cts.	2418 36	
Embankment, 2500 do at 15 cts.	375	
2 culverts, at $ 150	300	
10 stone drains, at $ 30	300	
Paving the road 10200 perches at 50 cts.	5100	
		$9,108 36

3rd mile.

Grubbing, clearing and chopping.	615	
Average slope 9 deg.		
Excavation, 15,340 cubic yds. at 14 cts.	2147 60	
Embankment, 2000 do do at 15 cts.	3 0	
4 culverts, average $ 150	600	
8 stone drains, at $ 30	240	
Paving the road, 10290 perches at 50 cts.	51000	
		$9,002 60

4th mile. Stony (crosses the turnpike road, at the beginning of the mile.)

Grubbing, clearing and chopping, per estimate,	615	
Average slope, 7 deg.		
Excavation, 11632 cubic yds. at 18 cts.	1744 80	
Embankment, 2000 do at 15 cts	300	
2 culverts, average $ 150	300	
10 stone drains at $ 30	300	
Paving the road 10200 perches at 50 cts.	5100	
		$ 8359 80

5th mile. Stony.

Grubbing, clearing and chopping, heavy,	715	
Section slope, 7 deg.		
Excavation, 11632 cubic yds. at 16 cts.	1861 12	
Embankment, 1000 do at 14 cts.	140	
10 stone drains,	300	
Paving the road, 10200 perches at 40 cts	4080	
		$7096 12

6th Mile and 84 chains, (to 6 mile bench on first line.)

Grubbing, clearing and chopping, heavy, slope 7 deg.	764		
Excavation, 12868 cubic yds. at 16 cts,	2058	48	
Embankment, 1000 at 14 cts.	140		
2 culverts	300		
10 stone drains,	300		
Paving the road, 11284 perches at 40 cts.	4540	00	
			$8,076 48

7th Mile. Stony,

Grubbing, clearing and chopping, Slope 10 deg.	615		
Excavation, 17274 cubic yds. at 16 cts.	2763	84	
Embankment, 1500 do at 16 cts.	240		
2 culverts,	300		
10 stone drains, at $30	300		
Paving the road, 10200 perches at 40 cts.	4080		
			$8298 84

8th Mile, passing Lilley's mills.

Grubbing, clearing and chopping average slope 12 deg	$615		
Excavation 21,323 cubic yards at 15 cents	3,198	45	
Embankment 2,500 cubic yards at 15 cents	375		
Four culverts average $150	600		
One bridge over Bear rock run	400		
Six stone drains	180		
Paving the road 10,200 perches at 50 cents	5,100		
			10,468 45

9th Mile.

Grubbing, clearing and chopping average slope 28 deg.	$615		
Excavation 37,252 cubic yards at 16 cents	5,960	32	
Ten stone drains	300		
Paving the road 10,200 perches at 50 cents	5,100		
			11,975 32

10th Mile.

Grubbing, clearing and chopping average slope 14 deg.	$615		
Excavation 25,629 cubic yards at 16 cents	4,100	64	
Embankment 2,000 cubic yards at 15 cents	300		
Three culverts (1 at $200)	500		
Seven stone drains	210		
Paving the road 10,200 perches at 50 cents	5,100		
			10,825 64

11th Mile.

Grubbing, clearing and chopping average slope 20 deg.	$615	
Excavation 40,707 cubic yards at 16 cents	6,513 12	
Embankment 5,000 cubic yards at 14 cents	700	
One bridge over Ben's creek	400	
Ten stone drains	300	
Paving the road 10,200 perches at 40 cents	4,080	
		12,608 12½

12th Mile.

Grubbing, clearing and chopping section slope 11 deg.	$615	
Excavation 19,264 cubic yards at 14 cents	2,696 96	
Embankment 1,000 cubic yards at 14 cents	140	
One culvert	150	
Ten stone drains	300	
Paving the road 10,200 perches at 60 cents	6,120	
		10,021 96

13th Mile. White-pine grove.

Grubbing, clearing and chopping, uncommon slope 10 deg.	$1,000 per mile	
Excavation 17,274 cubic yards at 14 cents	2,418 36	
Embankment 3,500 cubic yards at 14 cents	490	
One culvert or bridge for Beaverdam run	300	
Ten stone drains	300	
Paving the road 10,200 perchse at 60 cts	6,120	
		10,628 56

14th Mile.

Grubbing, clearing and chopping, heavy slope 9 deg.	$1,000	
Excavation 15,340 cubic yards at 14 cents	2,147 60	
Embankment 1,000 cubic yards at 14 cents	140	
One bridge	300	
Ten stone drains	300	
Paving the road 10,200 perches at 60 cents	6,120	
		10,007 60

40 chains of the 15th mile, the junction of the lines.

Grubbing, clearing and chopping, lighter slope 4 deg.	$300	
Excavation 4,000 cubic yards at 14 cents	560	
Embankment 3,000 cubic yards at 14 cents	420	
One bridge over Trout run	300	
Two culverts	300	
Five stone drains	150	
Paving the road 5,100 perches at 60 cents	3,060	
		5,090 00
Making 14 miles 48½ chains the length of this route, and the amount of its cost		$140,350 35

The following abstract from the preceding estimate shews the distances, average cost per mile and cost of each route from the junction of the lines near the Conemaugh, across the mountain by way of each summit to each of the proposed basins.

ON THE JUNIATA.

Routes by Rob's creek summit.

1. Route by way of Newry to the basin near Frankstown, 32 miles 19 chs, at 10,543 48 per m,	$339,895 34
2. Route by Newry to the basin near Poplar run, 28 miles 33 chains, at 10,652 05 per m.	302,655 56
3. Route by the south side of the Blue Knob to the Cove basin, 26 miles 66 chains, at 10,571 65 per mile,	283,584 46

Route by the Sugar run summit.

1. Route by the north side of Sugar run to the basin near Frankstown, 29 miles 48½ chains at 8391 19 per mile,	$248,431 80
2. Route by the north side of turnpike to the basin near Frankstown, 33 miles 22½ chains at 9559 59 per mile,	318,155 25
3. Route by the south side of turnpike to the basin near Frankstwn, 33 miles 54½ chains at 10,325 24 per mile,	345,185 74
From the junction of the lines down the Conemaugh to Johnstown, 17 miles 40 chains at $9500 per mile,	166,250

To the average cost per mile add the estimate cost of one mile of rail way, viz. $7820 30, and the amount will be the average cost per mile on either of the above routes.

All of which is very respectfully submitted,

NATHAN S. ROBERTS,
Chief Engineer

No. 5.

Report in the survey of basins, canal and rail-way routes, between the waters of Delaware and Susquehanna, by Moncure Robison, Engineer.

To the canal commissioners of the state of Pennsylvania.

GENTLEMEN,

I have the honor to submit to you the following as a part of my report, on the different surveys and examinations which have been made by me during the past season, with a view to rail-roads, and to a water communication between the North branch of the Susquehanna river and the Delaware. The late period at which

my field duties were closed, prevents my furnishing at this time accompanying draughts and estimates. These are in preparation, and will be transmitted to your honorable board as soon as completed.

In consequence of the novelty of rail-roads in our country, misapprehensions appear to have existed as to the class of cases in which they are applicable. It may not be out of place, before proceeding to a description of field operations, to bestow some consideration on this subject.

It has been suggested that the cheapness of timber gave to us an advantage in the construction of rail roads, which would so far diminish their first cost, as to recommend their construction in many situations, where in Europe they would be deemed unsuitable improvements; and it has been thought not only that a much smaller trade would justify a rail road in our country than has heretofore been deemed requisite in England, but likewise that much bolder experiments might be made by us, in overcoming ascents by graduation.

It is very readily admitted that the first cost of a plate rail-road in Pennsylvania, on which a horse will exert nearly the same useful effect as on the best constructed rail-roads of England, will require in general a much smaller investment of capital, and notwithstanding the necessity of more frequent repairs, would be justified by a trade proportionally smaller. It is believed however, that there is nothing in this circumstance which will authorize a *very material** deviation from the principles adopted by the most distinguished British engineers, in the plan and location of such works.

With them there is some difference of opinion as to the relative cost of transportation by locomotive engines and by horses, and the problem is complicated by the necessity of incurring an increased expense in the construction of rail-ways on which locomotive machinery is proposed. There is however, and ought to be but one opinion as respects graduation.

This is, that if horse power is to be employed, that graduation should be adopted on a rail-road as nearly as practicable, which is best suited to the anticipated trade; or in other words, which will render necessary the same number of horses to transport each way, with equal facility, the anticipated tonnage. If any facility beyond this point is afforded in one direction, it necessarily, and to the same extent operates as a difficulty in the way of transportation in the opposite direction.

On the Stockton and Darlington rail-way, it has been found by experiments with the Dynamometer, that a descent of $\frac{1}{8}$ of an inch

* A *very material* deviation. Undoubtedly deviations impairing in some degree the value of an improvement are allowable where the *cost* of the improvement is diminished, but these deviations, as will be seen, must be slight, or the objects of the improvement in a great degree lost.

per running yard, or of eighteen feet per mile, is that on which it requires the same muscular effort of a horse to descend at a given rate with loaded waggons, or to return with empty. The waggons in these experiments were reduced to their minimum weight, and constituted about 25 per centum of the whole load. This of course forms the extreme point of *advisable* graduation in a rail-road. As the inequality between the ascending and descending trafic of a rail road becomes diminished, the road-way should in the same ratio approach to a level.

It will be agreed that the extent to which rail-roads could be introduced in most countries would be but small, were the ascent they could overcome limited by the graduation which would accord with these positions; and the ground over which they could be located, would be in general that on which a canal would be preferable. Accordingly public attention had been but very little drawn to them in England until within a few years past. The application of locomotive machinery in the beautiful experiment of the Stockton and Darlington rail-way and the introduction of inclined planes and stationary power or other lines of rail-way, have enlarged the scope and capability of rail-ways to a degree which some years since could not have been predicted, without incurring the reproach of an overshare of enthusiasm. A It is to these aids,

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A. The expensiveness of horse power for raising trains of waggons on the inclined planes of rail-ways, may be appreciated by the reflection, that if one pound suspended over a sheave will keep in motion two hundred pounds when started, on a level rail road, a horse can with equal facility draw two hundred pounds, or raise one: or what is in other words the same proportion; that as great an expenditure of power is required to raise a given tonnage one mile, as to transport it two hundred miles.

Fixed steam engines, where a trade is sufficient to justify powerful machinery, and to keep it constantly employed, diminish in a very large proportion, the cost of overcoming ascents. Was the business of a rail-road considerable enough, they would likewise present a far cheaper power than either locomotive engines or horses, for overcoming the resistance produced by friction. In but one instance however, that of the Hetton Colliery rail-way, have they been recommended exclusively of other power, by considerations of economy. The enormous business of this rail-road, and the regularity to which it has been found possible to reduce it, render them for every service on the line the most economical, and on other considerations the most advisable power.

A very different case is presented on a rail-way, on which the trade would be but limited and uncertain. For the inclined planes of such a road, fixed engines would be smaller, of course their attendance more expensive in proportion, than that of larger engines, and they must be kept in readiness to raise trains of waggons at an annual expense not a great deal less than would be required

to the cheapness of stationary power where a business of considerable extent can be commanded, and to the capability which locomotive engines possess within certain degrees of graduation, of being made to produce at all times, their maximum of useful effect, either in power, or in velocity, that the rail-road must look for the largest developement of its advantages and resources. That it never can be advantageous to overcome considerable ascents by graduated rail roads, on which horse power is proposed, the following consierations abundantly prove.

The force exerted by a horse transporting a weight on a common road in overcoming an ascent, is of two kinds; that necessary to overcome the friction of the roadway, and that expended in lifting his load. It is only in economising the first of these forces, that the railway is made a labor saving machine: The last must always remain the same on an inclined plane of every kind, and continues a fixed quantity at the same angle of ascent on a country road, M'Adamized turnpike, or the most perfectly constructed rail-read.

Though therefore in the case of a *level* turnpike, its substitution by a railway has the effect of reducing the power requisite to produce a given effect to the tenth or twelfth part of what was previously required, yet the result arrived at is widely different, if an ascent be admitted in the railway, which would be scarcely sensible in a turnpike, and at any rate be attended with no serious disadvantage. The important bearing of this subject and its susceptibility of being settled with precision, will form an excuse for some further investigation.

Differences of opinion are entertained among professional men as to the power of a horse. The standard fixed by Mr. Watt, in his estimates of steam power is certainly too high, and while some late writers have estimated the power of a good horse travelling eight

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to keep them constantly at work. Under these circumstances the toll at lifts to indemnify the proprietors of the rail-way, must on a ton of property be nearly in an inverse ratio with the business of the road.

Locomotive engines in this case will generally constitute the most advisable power, provided the ascent and descent of the railway can be overcome by such a rise and fall per mile as will admit of the engine urging on its load by the mere adhesion of the its wheels. A considerable deduction it is true is to be made from their useful effect on account of the weight of the engine itself. But this is found to be more than counterbalanced by the expense of attendance and of dormant power in fixed engines not steadily employed; and compared with horse power they not only present a great gain in point of economy but the important advantage of exerting at all times their full force, on the steeper parts of the road in overcoming its greater inclination, on more gentle ascent or on descent, in urging forward the load with increased velocity.

hours per day at the rate of 2½ miles per hour, as equal to raising 125 pounds suspended over a pulley, others have reduced his power of traction to 112 pounds. However this may be, the experiments of Messrs. Wood and Stephenson, with the Dynamometer have ascertained with certainty the force requisite to overcome friction on well constructed rail-roads. The conclusion at which they have arrived after a series of well conducted experiments under favorable circumstances, but such as are attainable in practice, is, that one pound suspended over a pulley will keep in motion 200 pounds on a level railway.

This fact is all that is necessary to determine the precise diminution of useful effects in forces of any kind, exerted on inclined planes, compared with that produced on levels. To ascertain the precise weight which can be kept in equilibrio on a plane, by a given weight suspended over a pulley, we have only to multiply this weight into the length of the plane, and to divide by its height, or in other words, to multiply the weight by the distance in feet in which the plane rises one foot. If we then ascertain by a common proportion the additional weight which must be suspended in order, to overcome the friction of this ascertained amount, we have at once the whole power required to produce a given effect.

For example, on a plane rising one foot in one hundred, or 52.8 feet per mile, 112 pounds suspended over a pulley would keep in equilibrio 11200 pounds, or five tons. To overcome the resistance produced by the friction of this quantity would require (supposing it the same on a level railway or an inclined plane,) $\frac{1}{200}$ part of the amount, or 56 pounds more The whole weight necessary to be suspended would be 168 pounds, and the useful effect of one pound would be equal to overcoming the resistance of 66⅔ pounds, that is to say, ⅓ of that produced on a level railway.

The following table will present the useful effect of a pound weight suspended over a pulley in overcoming resistance on rail-roads at different angles of inclination deduced from the foregoing reasoning: a glance at it will show the rapid diminution of useful effect at every increase of acclivity.

Distance in feet in which a rail way rises one foot	Rise per mile.	Useful effect of one pound suspended over a pulley.	Useful effect of a horse, supposing his power to 112 lbs. in pounds.	Useful effect of a horse in tons.
1000	5.28	166.67	18.667	8.33
900	5.87	163.64	18.327	8.18
800	6.60	160.00	17.920	8.00
700	7.54	155.56	17.422	7.78
600	8.80	150.00	16.800	7.50
500	10.56	142.86	16.000	7.14
400	13.20	133.33	14.933	6.67
300	17.60	120.00	13.440	6.00
200	26.40	100.00	11.200	5.00
100	52.80	66.67	7.467	3.33
60	88.00	46.15	5.169	2.31

The allowance for horse power given in the preceding table may possibly be supposed too small, whilst it will in general be deemed quite sufficient. It may however be a matter of some doubt whether on such rail-roads as it will be for a long time advantageous to construct in Pennsylvania, (wooden rails plated with iron bars,) as large a proportion of useful effect may be anticipated, as on the cast and wrought iron railways of England. The following formula presenting a more abstract view of the subject is therefore subjoined.

Supposing D the distance in which a rail way rises 1 foot.
H the power of a horse or the number of pounds he can *raise*, travelling $2\frac{1}{2}$ miles per hour.
T the number of pounds he can *draw* when traveling at the same speed.

Then $\frac{DH^2}{H \times DH^2} = \frac{}{T}$ = the performance of a horse.

A comparison of the result of this formula with these given in the last column of the preceding table will serve to establish its correctness.

It must be observed that the preceding reasoning does not apply to the case of an undulating rail way, or one of *short* as well as slight ascents and descents. On such a rail way the greater occasional efforts of the horse are compensated by his alternations of light labor, and the advantage of bringing into play new muscles, balances the injurious effects arising from his being occasionally overloaded.

It may be worth while to add before leaving this subject, that experience, in the only case in our country in which it has been attempted to overcome considerable ascents by graduations is in perfect accordance with the foregoing views. The rail way of the Lehigh company at Mauch Chunk, overcomes a rise of 767 feet in eight and a quarter miles, averaging about one degree of acclivity per mile. I was informed by the intelligent gentleman to whom the affairs of the company are intrusted, that the fair performance of three mules is to transport up the plane seven empty wagons, weighing about 1450 pounds each, or making an aggregate of $4\frac{1}{2}$ tons, each set of mules making $2\frac{1}{2}$ trips per day. Two very strong horses he thought would be equal to the same task which would give $2\frac{1}{4}$ tons for the performance of each horse. this is less than the useful effect of an average horse given in case 10th of the preceding table in which the plane would be somewhat steeper. The difference may be ascented to the unequal distribution of the rise of the plane, and some other disadvantages, constructed as the Mauch Chunk rail way was for a trade altogether descending, motives of economy might have recommended this large declivity. In a rail way however, intended for a promiscuous commerce, enough has been said to show that such a location would promise and perform but little.

Under these views, it has been deemed important to conduct the examinations with a view to rail roads, in such a manner as to ascertain with certainty.

1st. The least possible elevation necessarily to be overcome between the points specified in instructions as points of termination.

2d. Where horse power alone could be employed. The least ascent per mile necessarily to be overcome by graduation between the Susquehanna and the dividing ground, that is to say, in the direction of greatest transportation.

The survey first to be attended to, was "that from some point on the Schuylkill canal to a point or points on the Susquehanna river, between Cattawissa and Sunbury, with a view of connexion of these points by a rail-road.

The difficulties in the way of this connexion arise from the depth and directions of the valleys of the Mahanoy and Little Mahanoy. Heading with the most easterly branch of the Schuylkill, the first of these streams pursues a general course of S 11° W, and in consequence crosses a tolerably direct line from the head of the Schuylkill navigation to a point within the range admitted by the law, nearly at right angles. The Little Mahanoy has a shorter course, but the same direction, and at their junction these streams present a gulf 700 feet lower than the most depressed point of the Broad mountain. Formidable as is the obstacle thus presented in the way of a rail-road, it nevertheless appeared that this was the most favorable point for crossing the Mahanoy valley. A line crossing lower would of course have to pass over a point still more depressed, and one crossing higher must necessarily traverse two valleys instead of one, and an intervening ridge, unless traced around the sources of the lesser stream. It was discovered also on a survey and level of the Broad mountain, that its most depressed points were in the neighborhood of the forks of the stream, and the same fact was so evident on a view of the Mahanoy mountain, or the ridge dividing the tributaries of the stream, and those of Roaring creek and Shamokin, that it was deemed unnecessary to establish the precise difference with instruments.

Lines accordingly were traced from dam No. 1, of the Schuylkill navigation, across each of the most depressed points of the Broad mountain, to the forks of the Mahanoy. The first of these lines passes through the borough of Pottsville, ascends the valley of Norwegian creek to station No. 54, three miles and seventy-three and a half chains from our point of commencement, and there rises by an inclined plane 108 feet of perpendicular elevation to a depressed point in the ridge between Norwegian creek and the west branch of Schuylkill. From this point the line rises eight feet per mile to the foot of the Broad mountain, which is ascended by a series of inclined planes and graduated road-way to the summit. At this point we are elevated 950 feet above our point of commencement, and 750 feet above the forks of Mahanoy. From the summit to the forks the descent is effected down the valley of

Rattling run, in the same manner as the ascent of the Broad mountain, by inclined planes and short intervening stages of graduated road-way.

The second line to the forks of Mahanoy diverges from the one above described at station No. 18, immediately beyond the borough of Pottsville. This line might perhaps have been most advantageously commenced, near the furnace of Mr Pott, but it was not deemed essential in a preliminary trace to fix with precision its point of commencement. Passing up the east branch of Norwegian creek to station No. 8, thirty rods below the North American company's coal mine, it here rises by an inclined plane 110 feet to the level of a depressed point in the dividing ridge between this branch of Norwegian and mill creek. Afterwards passing up the valley of the last named stream, it attains the most depressed point of the broad mountain, at an elevation of nine hundred feet above our base, near James Stephens', in a distance of six miles and thirty-five chains farther. The whole distance being overcome by four inclined planes, affording an aggregate lift of 705 feet, and something less than six miles of graduated rail-way, rising from ten to twenty feet per mile. From letter C, or our summit at this point, the line is traced along the northern slope of the Broad mountain to a bridge 15 feet high at the forks of the Mahanoy, descending by inclined planes 485 feet, and 200 feet more by a graduation of 30 feet per mile.

From dam No. 1 to the forks of Mahanoy, the whole distance by the 1st, or westerly line, is 12 miles and 77½ chains; by the 2d, or easterly line, the distance is 16 miles and 42 chains. The difference in distance 3 miles 44½ chains, is counterbalanced by important advantages in the easterly line. This last line can be more advantageously graded, and its summit is fifty feet more depressed than that of the first or westerly line, and more depressed than any other part of the Broad mountain between the Little Schuylkill river and the head of Mahantango creek. A more material recommendation of this line is the extensive accommodation it will afford to an abundant coal district. The veins of coal which are broken by the Mill creek, and which would be generally accommodated by it, are represented as the most valuable in the neighborhood of Mount Carbon, and the point at which this line crosses the Broad mountain, is believed to be the only one by which the valuable bodies of coal between the head of the Mahanoy and its tributary the Shenado, could be commanded.

From the forks of Mahonoy, the only feasible route to the Susquehannah, would be in a great degree by the valley of the Shamokin. Rising by three inclined planes, to the most depressed ground between the Mahonoy and the Shamokin, at an elevation of 460 feet above the forks of Mahonoy, the line was afterwards carried along the valley of this stream, 17 miles and 74½ chains to No. 628, falling in this distance by three inclined planes 290 feet, and 393 feet by a graduation varying according to localities between 10 and 30 feet per mile. From this station (near the Shamokin meeting-house) two lines were traced to the Susquehan-

na. The first, five miles and nine chains long, ascends the Shamokin ridge by two inclined planes to the proposed summit, near the school-house, elevated 287 feet above No. 628, and thence descends by a continued inclined plane, to the river at John Boyd's Mill. The 2d line 10 miles and 62 chains long, passes along the Shamokin valley on the north side of the stream to Sunbury, falling in the whole distance 112 feet or between ten and eleven feet per mile. It was deemed proper to carry the 1st. line down the Susquehanna, as far as the Danville bridge, in order to ascertain what facilities or difficulties would present themselves in the way of a connexion with this town.

Extensive parrallel surveys and examinations, were made at different points, in determining on the trace above described. These resulted in the conviction, that no other lines crossing the Mahonoy valley were worthy of consideration, besides those a sketch of which has been briefly given above. The results arrived at were, however, far from satisfactory, and it was resolved to trace a line around the sources of the Lesser Mahonoy and Mahonoy creeks, to the head of the Cattawissa, and thence down this stream, to ascertain how far such a line might avoid the objections in those traced.

The experimental lines which were accordingly traced, resulted in the certainty, that from summit C, before mentioned as the most depressed point of the Broad Mountain, a railway is practicable along the Northern slope of that mountain, rising from 10 to 20 feet per mile to the head of the Mahonoy creek, and the dividing ground between this stream and the little Schuylkill; from this point a railway would be carried perfectly level to the most depressed point in the dividing ground, between the Little Schuylkil and the south branch of Cattawissa. Here it must descend 600 feet by inclined planes in something less than four miles, after which it would be carried on a descent, commencing at 27½ feet per mile and gradually diminishing to 13 feet per mile at the end of nineteen miles farther, thence to the town of Cattawissa, a railway might have a nearly uniform descent of 13 feet per mile.

SUMMARY OF PRECEDING LINES.

The whole length of a line commencing at dam No. 1, of the Schuylkill navigation, crossing the Broad mountain at the head of Rattling run, the Mahonoy at the forks, and ending at Sunbury, is 46 miles 25¼ chains.

That of a line crossing the Broad mountain at summit C. and passing thence along the northern slope of the same to the forks of Mahonoy, and thence as preceding line to Sunbury, is 49 miles 70 chains.

That of last described line terminating at Catawissa, is 58 miles 13 chains.

It remains to compare this last line with the most advantageous trace which would cross at the forks of the Mahanoy. This is believed to be decidedly that crossing the Broad mountain at summit

C, of course so far corresponding with the line to Catawissa. It will be useless then in a comparative view to go further back than this point.

1st. As to elevation to be overcome. This between letter C, and the summit of the Catawissa line, is 151.49 feet. Between letter C, and the culminating point beyond which a line falls to Sunbury, is 445.7 feet; making a difference to trains of wagons going to the Susquehanna of 294.21 in favour of the Catawissa route. To produce going from the Susquehanna to the Schuylkill, this difference would be increased, by the difference in elevation between the surface of the North branch canal, opposite Catawissa, and that of the pool at Sunbury, or by about 36 feet.

2nd. As to graduation. The Catawissa rout in being adapted to locomotive engines, appears to present itself on very favourable ground. But for a rail-road which would be a common highway and on which horse power would be employed its advantages in this respect would not counterbalance its increased length.

The merits of a line terminating at or near Danville, have been left out in the preceding comparison, such a line would not be as advisable for a public highway as the one terminating at Sunbury, in consequence of the amount of the stationary power which would in this case be required on each side of the Shamokin hill. But were a line of rail-way executed to Sunbury it might be advisable to construct a single rail-way to the North branch of the Susquehanna river at, or near Danville, on which transportation should be effected by individuals or a company. The business of the road might in this case be so arranged, as that trains of wagons should be in readiness to leave the Susquehanna at the time that returning trains would reach the foot of the Shamokin hill. The horses might be there unhitched, employed to draw up to the school-house summit in two loads, wagons going to the Schuylkill, and these last in descending into the Shamokin valley be made to lift up returning trains. The horses would then proceed with the trains going to the Schuylkill whilst those returning to the Susquehanna would run down to the river by their own gravity on a continued inclined plane. The saving in distance by this branch to so much of the trade of the North branch canal, as might be arrested by the rail-way where it first touched the river, would be about 18 miles.

It remains to consider the Catawissa valley in its most interesting aspect, not only as a line of communication with the head of the Schuylkill navigation, but as presenting in connection with the little Schuylkill the most direct feasible route from the the North Branch of Susquehanna to Philadelphia, and by way of Quakake valley a very direct route to the Lehigh. Examinations were made of these branches only so far as to settle the general question of practicability. It having been intended to return to them, in the event of completing in time other surveys which were deemed more important. It would require a more complete examination than was made and statistical facts of which I am not in possession to determine how far a rail-way along the Cntawissa valley with

branches as suggested from its summit, would be justified by the business it would command. That such a rail-way would command a very considerable trade, and a more extensive and varied business than any other line of rail-way between the North branch of the Susquehanna and the Delaware there is no doubt.

By its branches it would accommodate much of the anthracite district on the Lehigh, the whole of that on the little Schuylkill, the Mill creek and the Mahanoy. By the same branches supplies of provisions would be most conveniently and cheaply furnished from the fertile country on the Susquehanna to the mining districts on the waters of the Lehigh and Schuylkill. Produce which it would be an object to transport quickly to Philadelphia, and the greater part of the returning merchandise, would probably be conveyed by the Catawissa valley, and in the event of a temporary interruption in the navigation of the Susquehanna division of Pennsylvania canal, this line of rail-way by offering in such a contingency both the Lehigh and Schuylkill canals, would present a most valuable resource to the trade of the North and West branches.

It should be observed before leaving this subject, that the execution of a line of rail-road along the Catawissa creek, need not involve the execution of more than one of its branches in the first instance, and that this rail-road might be for the greater part of its length a single rail-road. If transportation was effected by locomotive engines, this would be equal to any business which could for some time reasonably be anticipated, and by placing transportation, as in this case it should be placed, in the hands of a company, it would be easy so to regulate the business of the road, as to avoid the meeting of trains of wagons except at fixed crossing places.

From the Catawissa and little Schuylkill summit, a line of levels was carried, and a critical examination made along the whole of the dividing ground between the North brance of Susquehanna, and the Lehigh, as far north as the Wilkesbarre and Easton turnpike; and more minute examinations made in relation to two lines of rail-way which have been proposed, the one by way of Black creek and little Schuylkill, and the other between Wilkesbarre and the Lehigh. Each of the proposed lines presents very great difficulties. An elevation of 1829 feet above tide in the one case, and 1834 feet in the other, must be overcome. Neither of the routes admits of an advantageous profile, and each would be very circuitous in proportion to the length of a direct line between its points of termination.

The next in order of field duties performed, was an examination of a route by the way of the Nescopeck and Lehigh with a view both to a canal and rail way.

A full examination of the whole dividing country between the North branch of the Susquehanna and the tributaries of the Delaware, commencing at the head of the Schuylkill, and continued as far north as the sources of the Lehigh, is conclusive of what had

been before believed, that no route presents facilities for the construction of a canal deserving of consideration with the exception of the valley of the Nescopeck. One branch of this stream heads within two miles of the Lehigh, at the point where the Lehigh affords a sufficient volume of water at all seasons for a lock and dam navigation. Our examinations were commenced at the most depressed point between the two streams, and directed in the first instance to ascertaining what supply of water could be commanded on a summit level.

Assuming for our base a level 14 feet lower, a line was traced up the valley of Wright's creek until the surface water of this stream was cut by it; thence across the gently sloping country which separates Wright's creek and Pine run, and crossing this stream was traced around the bluffs of the Lehigh, and up the valvey of Bear creek to a point at which this last stream can be conveniently taken in. These streams were guaged above the points where they were intersected, at a time when they were said to be very low, and at points which admitted of a satisfactory measurement of their volume. They were found to furnish.

Wrights creek, per minute	407.5	cubic feet.
Pine run, per do	201.3	
Bear creek per do	1425.3	
On an aggregate supply of	2034.1	

This handsome supply of water with the certainty that it could be materially increased by the construction of reservoirs on Bear creek, (for which very favourable situations present themselves,) and that the whole volume of the Lehigh might be commanded by a continuation of the feeder line, placed the subject of an adequate supply of water at rest, and returning to BM. SI. our point of beginning, the survey of a line of canal was commenced.

A line was traced from BM. SI. along the valley of Wrights creek to the Lehigh, and from the same point along the valley of the Nescopeck to a point of junction with the North branch canal 96 feet below the bridge at Berwick. The distance from SI. to the Lehigh is 2.23 miles and descent 209.217 feet. From SI. to the North branch canal, the distance is 35.05 miles and decent 8292.84 feet, making the whole length of canal traced 37.28 miles, and the whole fall to be overcome both ways 1038.501 feet.

The survey made was altogether topographical, without any assumption of base lines, which with the limited knowledge previously possessed of the country, must generally have varied from that which would prove most advisable, and have been unnecessarily a review of the field notes, topographical sketches and slopes of ground, presents the following as the most advisable profile of a canal.

The summit should be reduced 70 feet by means of a tunnel of 175 poles in length, and a deep cut for a short distance at each end. The Lehigh may in this case be commanded at the mouth of Bear creek by a dam 12 feet high, and a feeder not exceeding 5.12

miles in length. The fall still to be overcome to the Lehigh is 139.217 feet, and the descent to the North branch canal 759.284 feet. The descent to the Lehigh would be effected by locks of ten feet lift with intervening basins. At one point however (the falls of Wrights creek) four ten foot locks must be combined, (of course double locks resorted to) in consequence of the rapid fall in the ground at this place, which would render it very difficult to construct basins. On the Susquehanna side of the summit level, contiguous locks and basins (in one instance as many as five) may generally be obtained as far as the mouth of little Nescopeck, without any material accession of expense. Beyond this point it will be necessary often to construct a canal in the bed of the Nescopeck, and economy will recommend the lowest level which regard to the safety of the canal may admit; of course the fall in this part of the canal must generally be effected by detached locks.

The connexion with the north branch canal, will be made by an aqueduct 1230 feet long, and elevated 20 feet above the water of the river. The difficulties in the construction of a canal arise,

1st. From rock excavation. The feeder line traced by us would not certainly be the one adopted in the event of a very material reduction of the summit. But a great deal of rock must necessarily be encountered in a feeder line, whatever may be its profile. The tunnel must be perforated through red sand stone, and a large proportion of the deep cutting at each end, will consist of the same; the lock-pits must generally be excavated in the same kind of rock, and in excavating the intervening basins it will often be found.

Between the western termination of the summit level and the point at which the canal trace crosses the Berwick turnpike, a canal might be formed along the rocky declivities which frequently present themselves, by embankment. It will be judicious however, in such cases to encounter much rock in preference to forming the entirely or in a very great degree on steep slopes.

2d. In long stretches of embankment and slope wall. Between the summit level and Berwick Turnpike the sections of a canal would be often combined excavation and embankment; but below this point, the concave shores of the Nescopeck creek present every where either perpendicular cliffs, or a naked surface of rock. As far as the mouth of Black creek, a canal would be formed most conveniently at such points, by excavating a new channel for the Nescopeck in the opposite flats, occupying its bed, and protecting this *natural* canal by an embankment and slope wall, of sufficient height to guard against the freshes of the creek. Below the mouth of Black creek, the increased width of the Nescopeck will render it necessary to form the canal under similar circumstances, by embanking in the channel of the creek. The earth for this purpose will be generally obtained from the opposite flats, and though they in a great degree consist of sand, with a very slight mixture of loam, will be sufficient for forming a canal, provided a due degree of *weight* be given to an embankment. This would be most advantageously furnished by constructing the outside of the embank-

ment of loose rock presenting a larger, or smaller cross section in proportion to the height of the bank. On this loose rock a slope wall would rest, and the inside of the bank would be secured against abrasion by a pavement.

3*dly*. In the connexion with the North branch canal. The aqueduct contemplated for this purpose, would consist of arches of timber supporting a wooden trunk, and resting on stone piers. The piers of such a structure should be erected of large and well jointed stone, secured by carefully breaking joints, and occasional cramps. The wooden superstructure must necessarily be framed in the strongest manner, and will involve a considerable expense in iron bands and bolts.

A dam and tow-bridge by which it has been proposed to form this connexion, would not be advisable for the following reasons.

It would require a dam 17 feet high, one which would raise the surface of the river 14½ feet at the Berwick bridge, to place it on a level with the lower level of the canal at this place. A dam lower than this would operate as a drain on the North branch canal, in proportion to what it wanted of this height, and to the activity of trade on the Nescopec line, and would be therefore inadvisable.

How far such a dam would effect the line of canal, or the river flats above Berwick, I am possessed of no facts to determine. It would certainly present the following disadvantages.

The Berwick bridge would be endangered from accumulations of drift wood and ice against its arches; the entrance to the North branch canal would require an expensive guard lock and protection walls, spacious locks must be placed in the dam to pass arks and rafts. The *expense* of lockage on the Nescopec canal be increased by a lift of 8 feet, and the *amount* of lockage to boats passing from the Nescopec *up* the North branch canal, or *descending* the North branch and entering the Nescopec canal be augmented 16 feet.

It remains to mention the most formidable obstacle in the way of the canal. This is unquestionably the lockage. In addition to the rise in the Nescopec valley, and the fall from the summit level to the Lehigh, that of this last stream between Wrights creek and Mauch Chunk (597 feet) is to be added in estimating the cost and comparative value of this route.

The field notes and topographical sketches taken with a view to a canal furnish, also, the facilities and difficulties of the Nescopeck and Lehigh route, with a view to a rail-road. In a more depressed summit than that of any other route, it certainly presents one important advantage, which is counterbalanced.

1*st*, by the difficulties arising from frequent cliffs of rock on the Lehigh, and the lower part of the Nescopeck. This circumstance combined with the irregular fall in the latter stream, would render the grading of a rail-road along a considerable portion of the route a matter of much difficulty.

2*nd*, by the indirectness of the route, whether in relation to the North, or west branch of the Susquehanna.

It will be observed on reference to the map of Pennsylvania, that after having arrived by a railway at the mouth of Wright's creek, we are within 13 miles of the borough of Wilkesbarre. Produce then descending the Susquehanna river, or North branch canal must travel to Berwick by the canal or river, and $87\frac{38}{100}$ miles additional by a railway to attain a point which it could reach in about 15 miles, by a well graded turnpike road. An ordinary turnpike would under such circumstances compete very advantageously with a railway, and at any rate the advantages of the latter improvement would not be sufficiently decided to justify its being made.

In relation to the West Branch trade a line by way of the Nescopeck valley would be about 18 miles longer than one by way of Catawissa creek.

These remarks apply also to the proposed Nescopeck and Lehigh canal, with the difference only in favor of the canal as a superior improvement, and that it avoids a change in the mode of conveyance.

The field labors of the season were concluded by examinations, with a view to a connexion between Broadhead's creek and the Lackawanna. It has been thought that such a connexion might be effected either by a canal or railway, by two routes. The one passing up the valley of Roaring Brook, crossing the Lehigh and Tobyhanna rivers, near their source, and descending abruptly from the table land in which these streams rise to the valley of Broadhead's creek. The second leaving the valley of Roaring brook at a point where it approaches the west branch of Waullenpaupack, crossing the dividing ridge between the two streams, and afterwards retaining a level until a descent can be effected into the Broadhead's creek valley.

The result of the examination made with regard to the first route was unfavorable. A great elevation (1900 feet above tide) must be overcome, and much difficulty encountered in crossing the Lehigh and Tobyhanna rivers. A considerable fall of snow which occurred when the levels had progressed to within a short distance of Mr. H. W. Drinker's, prevented any examinations being made with instruments, with a view to the second route. A reconnoissance of a part of the ground necessarily to be traversed, made in company with Col. Porter of Easton, Judge Coolbaugh and Mr. Drinker, commissioners under the act incorporating the Delaware and Susquehanna canal and rail road company, was not as satisfactory as had been hoped. It is believed, however, by the commissioners, and it is thought very probable, that the elevation to be overcome by this route would not be within 300 feet of that to be overcome by a route crossing at the head of the Lehigh. Other opinions of these gentlemen are explained in a letter to the undersigned, which is herewith annexed.

All which is respectfully submitted.

MORCURE ROBINSON,
Civil Engineer.

Philadelphia, Dec. 4, 1828.

No. 6.

To the board of Canal Commissioners of the state of Pennsylvania.

GENTLEMEN,

Having completed the examinations of the Allegheny, Monongahela and Ohio rivers in conformity with instructions received from Joseph M'Ilvain, Esq. I have the honour to submit the following reports on each of the several routes, according to the order in which they were named in these instructions:

1st. THE ALLEGHENY ROUTE.

A detailed copy of the instructions which guided my examinations in the route, are as follows:

"To make the necessary examinations, surveys and levels along the valley of the Allegheny river, from the mouth of French creek to the mouth of the Kiskeminetas, and to report upon the practicability and estimated cost of making a canal between the said points; also upon the practicability and estimated cost of improving the navigation of said river for steamboats, by dams and locks, between the said points. And also upon the practicability and estimated cost of improving, by dams and locks, the navigation of said river for common canal boats, between said points. And also, upon the practicability and estimated cost of making a navigable communication between the said points, partly by canal and partly by dams and locks."

In compliance with these instructions, I shall proceed to notice 1st, the practicability and estimated cost of making a canal between said points.

In traversing the section of the Allegheny river, now in question, the eye of the engineer is presented with a greater extent of more serious obstacles to the construction of a canal, than are usual along rivers of a similar size. High, precipitous hills project on either side, to the waters edge, for a greater part of the whole distance, affording to the progress of a canal, an almost continued succession of high embankments. These are frequently to be made in deep water, but more commonly at an irregular surface, composed of detached masses of rock. Occasionally flats or bottom lands afford some relief to the roughness of the route, but these are so trifling in extent, in comparison with the bluffs, that the whole line is rendered remarkably expensive, and unusually unfavourable.

As the board have already been furnished with a minute, and I may add correct description of the character of this valley for canalling, in the report of Judge Geddes of 1826, I deem it unnecessary to remark further on this subject, and shall proceed to state that the present examinations were made with a view to a canal on the east side of the river. Having had no particular instructions with reference to this subject, I selected this side on the presump-

tion, that as the examinations of 1826 were made on the west side, it would be more satisfactory to the board, as well as to others interested, if the present one was made on the east side.

The only apparent obstacles of importance, which present themselves to the construction of a canal on this side, that do not appear to exist to an equal extent on the opposite, are the crossings of the Clarion, Redbank and Mahoning These are all streams of considerable size and importance, and would be valuable as feeders; but that the inconsiderable quantity of fall, and the excessive roughness of their banks in the vicinity of their mouths, precludes the possibility of their introduction into the level of a canal, without incurring serious expense.

The estimated line of canal commences about 15 chains below the mouth of French creek, and its level was assumed at 20 feet above the river surface. This was done with a view to its crossing the Allegheny on an aqueduct, and its extension up the valley of French creek, by which means it would receive its first supply of water from that stream. All further supplies it is proposed to take from the river by three dams, the location of which are as follows: The 1st at Patterson's falls on the thirtieth mile, the 2d at Early's Ripple, sixty third mile; and the 3d at Fort Run ripple, three miles below Kittaning, being at the end of the eighty-first mile. The top line of this dam is planned on a level with the top water line with the Kiskeminetas canal. The localities of each of these dams are favourable as accumulating sufficient fall to place the canal almost immediately out of reach of freshets. Objections may be raised to these dams as injuring the natural navigation of the river. This can only be remedied by the construction of river locks, or the adoption of the plan suggested by Judge Geddes, viz: the running a wall parallel to the shore, for the purpose of creating power and the elevation of the water into the canal by machinery.

Considering this an uncertain method of supplying a canal, constructed along a rocky valley like the Allegheny, where a very considerable quantity of water must necessarily be lost by filtration, I have estimated the line with a view to its supply by dams as above proposed.

By the present examinations, the distance from the mouth of French creek to the Kiskeminetas is 93¼ miles, and the fall is 223 feet. That this result differs materially from the one of 1826, will readily be perceived; and I am aware that it will produce much excitement in the minds of the board, as well as of others interested; an excitement, however, which I cannot otherwise relieve, than by assuring them, that great care was preserved in taking our measurements, both of distance and fall And also, that the United States' engineers, who were engaged on the Allegheny at the same time with ourselves, and who completed their examinations of this section of the river, on the same day, produced very nearly the same result that we did, the difference being less than one foot in fall, and one-fourth of a mile in distance. This difference may

easily have originated in a selection of the points of starting and terminating. Having made myself acquainted with this fact, I have no hesitation in presenting to the board both the distance and fall as stated above with full confidence in their accuracy.

The locks on the line have been dropped at such intervals as to preserve the surface of the canal above the freshets.

The estimates have been made for a canal 28 feet wide on the bottom, and the towing path 12 feet wide at the top. The river embankments to be supported by a wall of stone. Aqueducts with stone abutments and wooden superstructures.

The only deviation proposed on the line, from the common form of the canal, is immediately below the mouth of Crooked creek, (see map No. 18.) This stream enters into a narrow channel of the Allegheny, on the east side of an island, about three-fourths of a mile long, and a few rods below its head. It is here proposed to embank from the south end of Crooked creek aqueduct to the island, and continue the towing path along on the side of it to the lower end, from thence the direction is favourable for its return to the main shore.

By enclosing the channel in the manner as above described, the junction of Crooked creek with the river will be formed above the island. The great width of the west channel at this place, renders this plan perfectly feasible, and besides the advantages of furnishing a fine basin or reservoir, it will save in cost $ 6,245.

From the foot of lock No. 28 to the end of mile 81st, the canal is continued on a level to its intersection with the Kiskeminetas canal, by which means, the feeder taken from the dam at Fort run, will be introduced into that canal. Notwithstanding the ground passed over on this section of the line is more favourable than any other for a canal, yet, owing to the fall in the river, the great elevation necessary to attain the level of the Kiskeminetas canal, renders the construction of such parts of the line as require embankment, very expensive.

The fall from the mouth of French creek to the level of the Kiskeminetas canal, is 155 feet. To this add 20 feet for the assumed elevation of the aqueduct at French creek, and the fall on the present line will be 205 feet.

Thn following summary will exhibit the cost of each mile, including excavation of earth and rock, embankment, wall, grubbing, aqueducts, bridges, culverts, fencing, &c. calculated at prices varying according to the nature of the work and the facilities offered for doing it.

ESTIMATE.

Miles.	*Dollars. Cts.*	*Miles.*	*Dollars. Cts.*
No. 1	20816 17	7	19910 2
2	685 10	8	45820 63
3	25353 14	9	34106 11
4	30501 50	10	15480 6
5	6464 32	11	7908 15
6	15032 45	12	19240

Miles.	Dollars.	Cts.	Miles.	Dollars.	Cts.
No. 13	20320	25	No. 54	22250	4
14	13016	70	55	15776	20
15	34516	20	56	3410	45
16	12180	5	57	17060	81
17	10850	81	58	16116	10
18	13750	65	59	83100	25
19	37910	50	60	34150	6
20	16320	25	61	17024	15
21	10240	10	62	26800	31
22	6651	12	63	8521	50
23	21010	44	64	17400	62
24	7192	15	65	27910	12
25	13206	25	66	12801	
26	24800	31	67	20010	37
27	3601	11	68	63260	50
28	10050	62	69	31720	15
29	23560	20	70	3645	6
30	12262	15	71	4250	44
31	7924	10	72	21,310	12
32	14588	31	73	5,850	62
33	28204	50	74	35,632	00
34	6312	44	75	50,650	15
35	5490		76	40,320	25
36	18250	62	77	21,150	10
37	10780	6	78	3,875	18
38	8742	12	79	4,760	44
39	18500	25	80	30,745	12
40	49301	37	81	5,486	
41	25250	10	82	3,850	15
42	10368	81	83	5,756	25
43	12150	15	84	12,382	06
44	27945	10	85	36,760	62
45	10410	00	86	11,551	14
46	14030	25	87	30,680	44
47	3950	6	88	6,225	
48	30510	37	89	32,450	12
49	55220	10	90	15,880	50
50	26450	61	91	5,371	31
51	8362	15	92	45,710	06
52	3971	20	93½	17,080	15
53	24400	37			
				1,735,346	06
	Add 205 feet lockage at 3500 per foot			102,500	
	Cost of 3 feeders			71,735	
				1,909,981	06
	Add 10 per cent			190,958	10
			Total cost	32,100,339	16

ALLEGHENY SLACK WATER.

I now proceed to notice the practicability and estimated cost of improving the river by locks and dams for steamboats, between the mouth of French creek and Kiskeminetas.

It is to this species of improvement, that this river is peculiarly adapted. Its banks are uniformly high, and the fall is generally accumulated at the ripples, between which the pools are still and deep.

To locate dams therefore, at such places as would overcome the fall at the ripples without the necessity of excavating the river bed, has been the object of the present examinations. With this view, high dams have been located, as being the only effectual plan to make the improvement complete.

Owing to the extensive gravel bars, formed in the vicinity of many of the ripples, the adoption of low dams, and consequent low levels, would render extensive excavations below the outlet locks, in order to attain a sufficient depth of water, an item of serious expense, and in addition to the expense, the progress of steamboats confined to these narrow channels, must at all times be hazardous. The advantages attending the construction of high dams as proposed, will be to avoid the above mentioned inconveniences. To create a saving of ten dams, and by extending the length of the pools, materially to facilitate the passage of steamboats.

I am aware that a strong prejudice exists in the minds of many interested in this improvement against the adoption of high dams, for which two reasons are assigned:

1st. That they will tend materially to injure the rafting interest which is of great importance to the river.

2d. That a corresponding rise in the spring freshets will be produced equal to the full height of the dams, thereby doing much injury to private property.

With regard to the first objection, I have no hesitation in declaring my belief, that after the dams are completed, the water will never rise sufficiently high in freshets to admit lumber to pass over them in safety.

The locks however, have been planned sufficiently large to allow rafts to pass through them

As a great proportion of the lumber comes down the tributaries of the Allegheny, the rapidity of their course will undoubtedly be checked on arriving at the pools formed by the dams, and their progress down the navigation be extremely slow. How far this inconvenience will compare with the advantages to be derived from an improvement of the river, is a question which I shall pass over without comment, as being a subject for discussion to be decided by the wisdom of the legislature, and proceed to the second objection, by observing that the impression received in relation to an increased rise in the water in freshes, caused by the dams, is altogether erroneous, and generally originates with those who have

paid little or no attention to the subject. So far from an increase in the ordinary rise, it is on the other hand considerably diminished. On the Schuylkill river, where this species of improvement has been adopted to a considerable extent, and where the height of dams vary from 7 to 27 feet, I have ascertained both from observation and enquiry, that no complaints are heard respecting this imaginary inconvenience. But the better to substantiate my own opinion with regard to this subject, I would with pleasure refer the board to the instance of the Conestoga navigation.

Previous to the improvement of that stream, high water marks were seen along its banks, from ten to twelve feet above the surface of common low water. This was said by all to be the usual height of the freshes, and from this fact the possibility of constructing permanent dams on the stream was doubted by many. The dams, however were built, varying in height from 10 to 14 feet above the bed of the stream, and in no instance since their construction, has a rise of the freshet on the pools exceeded three feet, whereas on the unimproved parts of the river, the same complaints are heard of its rise as formerly.

This extraordinary difference is easily accounted for, by its increased surface on the pools and its unobstructed discharge over the dams.

Mills are in operation at several of the dams, and the sheeting for the water wheels is placed but four inches above the surface of the lower level. These have been so little affected by freshes, that their progress has not been interrupted for a single day.

Previous to the present improvement, the mills were supplied with water by low dams, the sheeting commonly from one to two feet higher than the surface below the mills, and while in this situation the owners have assured me, that in almost every freshet the operations of the mills were necessarily suspended. Another important fact relating to this navigation, is that the current on the pools during a high freshet, in time of breaking up of the ice, was found not to exceed one and one-fourth miles per hour.

That interesting improvement is now completed, and although cheap and simple in its construction, yet no fears are entertained of its permanency. Valuable water power is created at all the dams, and every species of craft that floats upon the Susquehanna, has now at all times, easy and safe access to the city of Lancast r. These, together with the trade incidental to a rich and populous country, will doubtless render it a profitable investment to its enterprising proprietors.

The above remarks have been elicited in the hope of dispelling the doubts and prejudices that exist with regard to the adoption of high dams, and all fears as to any additional rise of the water by freshes, equal to the height of the dams.

The construction of dams along the Allegheny, will necessarily be attended with considerable hazard and consequent expense. This will be chiefly owing to the depth and velocity of the current in the channels, where it was found necessary to locate the dams;

and to the sudden rises of the river, it being easily affected by showers. An evidence of this fact was afforded us while engaged on the river, by a rise of four feet in a single night, and this the result of a few passing showers the day previous. Such an occurrence during the progress of the work, would, unless due precautions were taken, be productive of serious consequences. These are difficulties however which can be overcome, so far as human foresight and power is applicable, by the selection of prudent and energetic men as contractors, who by proceeding cautiously, and at the same time expeditiously would, unless in some extraordinary case, complete the whole work safely and permanently.

A remarkable peculiarity in the character of this river is, that notwithstanding its banks are lined with rocks for a great proportion of its length, yet in not a single instance can a rock bottom be obtained for the foundation of a dam, and in but very few instances for the locks. The dams will in all cases stand upon a bed of coarse gravel, and the locks commonly upon the same material.

As the instructions given me in reference to the examinations and estimates for slackwater along this valley, imply three distinct improvements, the following descriptions and the succeeding estimate will represent the plan which is considered best adapted to the river, under existing circumstances, and will more properly embrace the terms, as stated in those instructions, an improvement partly by canal and partly by locks and dams.

From French creek to Fort Run ripple, three miles below Kittanning, it is proposed to construct eighteen dams and twenty-eight locks. Dam No. 1, to be located at Beck's ripple, two and a half miles below French creek, and its top of sufficient elevation to flow three feet of water on to the present surface of that stream at its mouth. This was necessary, in order to give four feet depth of water at that place; and by it a safe and convenient harbour is formed, which will materially facilitate an extension of the improvement, should it hereafter become necessary.

Below this place the dams have all been located at such points as the banks, bed of the river, and desired fall, rendered favourable. Wherever the height of the dams require two locks, pounds have been planned between them. The length of these pounds vary from three to fifteen chains, according to the difficulties to be encountered in obtaining a favourable position for the outlet lock. In two instances canals are proposed, viz: One at Patterson's falls, thirty chains long; and the other at Early's ripple, forty chains long. Each of these canals are calculated to save a dam, as there is a considerable fall in the river at their respective localities;—both the pounds and canals to be sixty feet wide.

At dam No. 18, (marked No. 19 on the map, and being the same proposed as a feeder dam for the canal line) it is proposed that the slackwater improvement for steamboats should terminate, and a connection be formed with the Kiskeminetas line, by a canal.

Two important advantages would result from this plan:

First, A saving of lockage would be effected, as follows: Fall from dam No. 18 to the mouth of Kiskeminetas, 41 feet; lockage from the Kiskeminetas canal down into the pool, 30 feet; total, 71 feet.

Second, The Allegheny would be introduced as a permanent feeder into the canal south of the aqueduct, as suggested in my remark. per canal report.

The foot of the slackwater improvement and consequent commencement of the canal was at first contemplated at Kittanning, but the expense of constructing the canal past the steep slip hill below that town was considered a sufficient inducement for the alteration, as by the present location the canal is not only placed out of reach of the floods immediately, but also on favourable ground.

The only mill now in operation on the line surveyed, is at Catfish falls. This mill by the present plan will be destroyed. And it is believed that it cannot be saved without enhancing the cost of the work beyond the value of the mill. The removal of a bar will also be necessary at these falls in order to afford 4 feet depth of water, but its situation is such that it can easily be removed.

The estimates have been made for crib dams, to be built of oak or pine, and to be filled with stone. A correct plan of the dam, together with the necessary descriptions will be seen by a reference to map No. 22, in the atlas.

The locks are estimated to be 120 by 26 feet in the chamber, and to be built of stone. These dimensions were assumed as being adapted to the size of the low water steam boats now in use on the Ohio. It is calculated that these boats will carry 60 tons of freight, drawing 3 feet water, and travel with two canal boats in tow, each carrying forty tons, at the rate of 5 miles per hour, or average including lockage 4 miles per hour. With this view of the subject, locks of this size were deemed best adapted both to the economy and capacity of the improvement. The cost of the dams and locks have been estimated with particular reference to the difficulties which are to be encountered in their construction. The following table will show the number, height, length and location of each of the dams; the number and lift of each of the locks, their total fall from French creek; the length of the pools, the length and cost of each of the pounds, &c. height of dams calculated from bed of river. Cost including wing walk.

Height of dams, calculated from bed of river. Cost including wing-walls.

Dams.	Locks.	Lift of locks.	Total lockage.	Length of pounds.	Localities of the dams and locks.	Length of the pools.	Height of dams.	Length of dams.	Cost of Dams.	Cost of pounds.
	No.	Feet.	Feet.	Chains.	Names.	m. & ch	Feet	Feet.	Dollars.	Dollars.
No. 1	1 & 2	6½ each	13	3	Beck's ripple and island.	2.40	14	850	28,550	822
2	3	8	21		Six mile run ripple.	3.28	12	600	16,225	
3	4 & 5	6 each	33	3	Foot of Sandy islands.	2.65	13	650	17,550	812
4	6 & 7	6	45	9	Charley's oven ripple.	4.67	14	845	20,250	2,439
5	8 & 9	6½	58	4½	Ripple No. 18, ½ m. above Falling sp'ng	5.07	14	695	19,465	1,221
6	10	8	66		Montgomery falls.	4.44	13	660	18,480	
7	11	8	74		Near Stoover's ferry.	2.36	12	690	16,250	
8	12 & 13	6½ each	87	30	Patterson's falls.	3.60	13	858	22,882	3,240
9	14	8	95		Foot of Nicholson's eddy.	2.34	12	590	13,550	
10	15 & 16	6 each	107	8	Spruce run ripple.	3.50	12	655	15,036	2,192
11	17	8	115	10	Lawrenceburg ferry.	4.24	13	860	18,320	1,255
12	18 & 19	6½ each	128	6	Rattlesnake ripple.	2.74	14	665	17,624	1,525
13	20 & 21	6	140	15	Armstrong's ripple.	6.46	14	725	20,152	2,450
14	22 & 23	6	152	3	Ripple No. 38, 2 ms. above Redbank.	7.21	13	730	18,990	812
15	24 & 25	6½	165	40	Early's ripple.	4.21	14	875	23,846	6,950
16	26 & 27	6	177	5	Mahoning ripple.	6.16	13	760	18,760	1,150
17	28	8	185	3	Near mouth of Pine creek.	4.48	13	920	20,080	755
18	This dam is marked No. 19 on the map.				Fort-run ripple.	7.60	18	800	25,025	
									346,035	25,623

Cost of the dams,

Cost of the dams,	$346,035
Pounds and canals,	25,623
Removal of rocks and gravel bars below the locks,	5,275
Cost of 12¼ miles of canal from Fort-run to Kiskeminitas,	219.697
Guard lock at head of canal,	2,050
165 feet of lockage at $1,300 per foot lift,	240,500
	839,180
Add ten per cent.	83,918
Total cost,	$923,098

Having thus shown the cost of an improvement which. from its saving of dams and the advantages offered for its connection with the Kiskeminetas canal, seems at present best adapted to the river. It remains for me to exhibit the cost of an improvement for steam boats between said points by locks and dams without canals, and and also an improvement for common canal boats by locks and dams.

By the first plan, the canal at Patterson's falls will be dispensed with, and a dam at the the head of Nicholson's eddy 765 feet long and 11 feet high will be substituted in its stead. Also a dam at Dickinson's falls 685 feet long and 12 feet high, in lieu of the canal at Early's ripple. By this last alteration the height of the dam at Mahoning will be lessened 2 feet.

Dam No. 18, near Kittanning (as marked on the map) 930 feet long and 13 feet high will be required. Dam No. 19 will be 12 feet high instead of 18, as represented in preceding table; and dams No. 20, 990 feet long and 12 feet high. No. 21, 858 feet long and 13 feet high. No. 22, 810 feet long 11 feet high; all of which are marked on the map, will be necessary to make the required navigation between said points.

Pounds between the locks are estimated in this plan as being necessary to any improvement of the river, unless by low dams.

The number, localities and cost of the dams for an entire steamboat navigation will stand as follows.

Dam No.	Localities.	Cost.
1	Beck's Ripple	$23,550
2	Six mile run	16,225
3	Foot of sandy islands	17,550
4	Charley's Oven ripple	20,250
5	Ripple No. 18, ½ mile above the Falling spring	19,485
6	Montgomery's falls	18,480
7	Near Stoover's ferry	16,250
8	Patterson's falls	22,882
	A dam at the head of Nicholson's eddy, (not marked on the map)	16,740
9	Foot of Nicholson's eddy	13,550
10	Spruce run ripple	15,056
11	Lawrenceberg ferry	18,320

Dam. No.	Localities.	Cost.
12	Rattlesnake ripple	$ 17,624
13	Armstrong's ripple	20,152
14	Ripple No. 38, 2 miles above Redbank	18,990
15	Early's ripple	25,846
	Dam at Dixon's falls, not numbered on map	15,645
16	Mahoning ripple	16,700
17	Pine creek ripple	20,680
18	Near Kittanning	21,740
19	Fort run ripple	17,815
20	Nicholson's falls	22,830
21	At island near Darrickman's run	2 ,955
22	Near aqueduct	19,760
		458,495
To connect this dam with the still water, below the mouth of Kiskeminetas, 15 chains of canal will be required.—Cost		3,965
Add the cost of necessary pounds		14,233
223 feet of lockage at $1,300 per foot		289,900
Excavation and removal of rocks below the locks		9,356
30 feet lockage from the Kiskeminetas canal into the pool		18,000
		793,949
Add 10 per centum		79 394
Total cost		$873,343

By an improvement for common canal boats, the locks will be confined to one side of the river, which will render the removal of gravel bars a subject of frequent recurrence.

The towing path will require a protection wall for the whole distance. The estimates have been made for a towing path inclusive of river excavation, and averaged per mile. The localities of the dams will be the same as in the preceding plan. The locks will be 90 by 15 feet in the chamber. The cost of these locks will be enhanced beyond the cost of locks on a canal line, by the great difference in the height of the walls and the difficulties attendant on preparing their foundations.

The construction of a towing path will necessarily be very expensive, from the vast amount of wall required, and the dangerous slip hills to be encountered.

The cost of this improvement will stand as follows:

Estimate of 24 dams as preceding	$ 458,495
Towing path and excavation at $900 0 per mile	839.250
Lock pounds	14,238
223 feet of lockage at $1000 per foot	223,000
Lockage from Kiskeminetas canal into pool	18,000
	1,552.978
Add ten per cent.	155,297 80
Total cost	$ 1,708,275 80

By the preceding estimate it will be observed, that the entire improvement by lock and dams is the cheapest. This plan, however, is very objectionable, as all boats destined from the canal to French creek, must necessarily encounter 71 feet additional lockage, as heretofore mentioned; and besides this inconvenience, no water will be introduced into the canal from the Allegheny as a feeder.

EDW. F. GAY,
Engineer.

MONONGAHELA REPORT.

The duty assigned me in relation to the Monongahela river will be seen by the following instructions.

That examinations, levels and surveys, be made along the valley of the Monongahela, from the Virginia state line to Pittsburg, with a view of determining the most eligible mode of affecting a communication either by canal or slackwater navigation. And that in contemplation of a slackwater navigation, to report in addition to other proper and necessary matters, precise accounts of the number of dams and locks necessary to be erected, their respective dimensions and localities. The materials of which they should be constructed, and the plan, manner, and estimated expense of the same separately. And further that the plan shall be so arranged, if practicable, as to preserve from injury, the mill works and water power now in use on said river.

In compliance with the above instructions, my attention was necessarily first directed towards ascertaining the practibility of either, or both of the improvements implied by them Accordingly I visited the river at several points to ascertain its general character, and from my own observations, together with the information derived from many gentlemen of respectability who resided along the river, I became satisfied, and during the examinations, confirmed in the opinion, that a canal cannot be made along this valley at a reasonable expense, and therefore that it is unnecessary to make any examinations with reference to its particular cost. The reasons which induced this conclusion, will be seen as follows.

The banks of this river are for nearly the whole distance examined, of a slippery nature. This characteristic is exhibited in the

face of the hills to a dangerous extent. As these elevated bluffs are washed by the river about one-third of the distance, the flats or bottom lands which are often extensive, vary in height, from twenty to fifty feet above the river surface, their average may be placed at about 35 feet, and although apparently even in their general surface, yet our levels show that a canal line entering upon them at an elevation of 30 feet above the river, would very often unavoidably encounter cutting twenty feet in depth, before arriving at their termination. This together with the necessity of passing the above mentioned treacherous bluffs, on levels sufficiently elevated to place the canal on the flats, and the difficulty of introducing feeders into such elevated levels, would render the construction of a canal an item of serious expense. The construction of a towing path along the river would also be attended with *extraordinary expense*; indeed so strong is the propensity of its banks to slip, for its whole extent, that the practibility of constructing a permanent towing path on either side, may be doubted. Having first satisfied myself with regard to the existence of these difficulties, I commenced at the Virginia state line, and continued my examinations solely with a view to an improvement of the steamboat navigation, believing also that its improvement would better answer the object desired than a canal. It may however here be well to institute a brief comparison between the advantages to be derived from a canal, and those of a slack water navigation along this valley. An improvement here of any kind is intended to accommodate the country through which it passes, it follows therefore that as a canal must necessarily be confined to one side of the river, its advantage must be in a measure limited. The inhabitants on the canal side of the river will enjoy facilities, which the difficulty of crossing and recrossing will prevent those on the opposite side from enjoying to an equal extent. Villages will spring up and flourish on the canal side, while those on the opposite side must proportionably decay.

On the other hand by an improvement of the river, equal facilities will be enjoyed on either side. The water power created at the dams, will become an object of great and increased value in a country already rich in agricultures, but destitute of these privileges. And the numerous villages which line its banks, and are at present so far from exhibiting the enjoyment of commercial advantages will be restored to permanent prosperity.

Although I am far from believing that this species of improvement, will or rather can be adopted as a general system, yet that it may in many cases, and in this one in particular, be made at great saving of expense, and possess advantages superior to a canal, I have not the slighest doubt.

From the description which has been given of the character of this valley for a canal, it will readily be observed that the height of the banks are unusually favourable for the elevation of water by dams. The bottom of the river is composed of coarse gravel, and in some instances a shallow deposit of sand covers the natural bed of gravel.

Good foundations have however been obtained for all the dams. One striking feature in the character of this river, and which constitutes an important reason in favour of its improvement, is its trifling fall in comparison with the distance; being from the Virginia line to Pittsburgh as follows: Fall seventy-five feet, distance 89 miles. On this distance eight dams and ten locks will be required to make a complete steamboat navigation, with four feet depth of water. The only obstacles to be removed from the bed of the river are a few of the artificial wing dams which have been constructed as an improvement of the ripples, and a few snags which have become fastened to the bed of the river. The removal of these however, owing to the shoalness of the water, will be attended with very little difficulty.

The dams have been located with particular reference to that section of the instructions furnished me, which implies a preservation from injury, the mill works and water power now in use on said river. And with the exception of two instances, the location of dams in the vicinity of these mills have been particularly favourable. The mills along this river are at present supplied by low wing dams, and can only grind in low water. If therefore they should receive their supply from the dams at present proposed, which are calculated to furnish a power throughout the year, their value would be materially enhanced.

As the board have already been furnished with a comparative view of the rise of freshes on pools and on unimproved parts of a river, per Allegheny report, I consider it unnecessary to furnish a repetition in this. It may however be well to add that a very considerable difference exists between the freshes east, and those west of the Allegheny mountains. The rise being nearly one half more on the west side. As it was shown in that report, that the freshes on the Conestoga, which were formerly 12 feet, are since its improvement but 3 feet, it may be safely inferred that the freshes on the Monongahela which are now about 20 feet, would seldom if ever after its improvement exceed 8 feet.

The following will show the respective localities of the dams, and locks, together with the reasons which induced such locations. Dam No. 1. located at New Geneva, is calculated to elevate the water to a level of the surface at the Virginia line. As the water is not four feet deep at this place, if any extension of this improvement should hereafter be affected, to which the citizens of Morgantown look forward with a deep interest, it will become necessary, either to locate another dam within the limits of this state, or to raise dam No. 1. two feet higher; but as this was not necessary for the present examinations, and as it would only serve to increase the lockage, it was omitted. By the location of dam No. 1. at Geneva, a fall of twelve feet is accumulated, and will be overcome by locks No. 1 and 2, of six feet lift each, having a pound between them of 300 feet in length. The advantages of this location will be perceived by its vicinity to the villages of New Geneva, and Greensburg, as these will be essentially benefitted by the valuable

water power created here, and a mill belonging to Colonel Heaton will be saved. The only injury done by the back water, will be the loss of a small saw-mill, owned by Albert Gallatin, and in operation upon George Creek, also 40 rods of road, which it will be necessary to raise three feet. This road passes along the side hill above Greensburgh, and is only raised in low water. Any attempt to save the saw mill by altering the position of the dam, would enhance the cost of the works far beyond the value of the mill. The only ripples on this level, are at the mouth of Cheat and Dunkard. Some excavation will be necessary to remove the wing dam at Cheat. No other obstruction exists, that will require any removal to obtain four feet water.

Dam No. 2. with locks No. 3 and 4 of 6 feet lift each, are located at Daniel Sharpnecks mill. This position was selected for the purpose of saving the mill, but it may be considered favourable in other respects. The materials for the construction of the works, can be conveniently obtained, also the bottom, and banks of the river are well calculated to ensure permanency. A pound between the locks will be necessary 600 feet in length. It will cross a large gravel bar, and terminate at a favourable position for the outlet lock. On this level, several ripples will be overcome, but no river excavation will be required, nor any injury done to private property.

Dam No. 3 with locks No. 5 of 8 lift, is located at Millsborough, and will flow the water back to Sharpneck's mill. On this level, the removal of a part of the wing dams at Armstrong's and muddy creek ripples will be necessary. The location of this dam at Millsborough, will save a grist and two saw-mills owned by Colonel H. Heaton, also a factory, grist and saw mill, owned by Esqr. Bumgarner. A canal will be required at this place 700 feet in length below the dam, in order to afford a favourable position for the lock into good water.

Dam No. 4, is located at Bridgeport with lock No. 6, of eight and a half feet lift. On this level the wing dam at Fishpot ripple must be removed, and the mill at that place owned by Henry Wise will be destroyed. As this mill is but two miles below Millsborough, and the fall in the river inconsiderable, no material variation from the present locations could be affected to save it.

The advantage to be derived from locating dam No. 4 above, instead of below the mouth of Dunlap's creek, will be the saving of a grist and saw-mill on that stream, and near its mouth, owned by Samuel Krepps, and also the lockage of all boats destined to Brownsville or Bridgeport. This plan will however render the removal of the bar and wing dams at that place, a matter of necessity. With regard to the water power to be derived from a dam at this place, nothing need be said, as it must, beyond a doubt, be very valuable.

Dam No. 5, and lock No. 7 of seven feet lift, are located at Baldwin's mill near Cookstown, and will flow the water back to Brownsville. On this level, in addition to the bar and wing dams at the mouth of Dunlap's creek, the removal of the wing dams at

the mouth of Redstone, and at Forsythe's Ripple will be necessary. By the vicinity of this dam to Cookstown, which is a village of considerable size, and the saving of Baldwin's mill, its location may be considered favourable. Some idea may be had of the inclination of the inhabitants in this district for manufacturing from the information which I received at Cookstown, that within three miles of that village, there are in operation, 27 mills of different descriptions. These however, being situated on tributaries of the Monongahela, which furnish very little water during midsummer, are chiefly all stopped at that time.

Dam No. 6, and lock No. 8, of eight and a half feet, are located at Parkenson's lower ripple, and will flow the water back to Cookstown. On this level there are no river obstructions to be removed, yet by the present location of the dam a considerable amount of private property will be destroyed; this will consist of a grist mill situated on the river, and a small saw, grist and fulling mill, on Mingo creek, and near its mouth. These establishments belong to Mr. Parkerson, and are calculated to grind only in low water. To save them *all* from injury, another dam would be requisite, and to save the river mill, the length of the present dam would be increased 170 feet. Therefore in either case, the cost of the improvement would be enhanced beyond the value of the mills. The present position for the dam was selected with due regard to the economy and permanency of the works.

Dam No. 7, and Lock No. 9, of eight and a half feet lift, are located near the mouth of Pine Run, and will flow the water back to Parkersons. On this level there are no river obstructions to remove. A rock foundation is obtained for the lock and I may add, that the positions selected both for the lock and dam, are remarkably favourable.

Dam No. 8, and lock No. 10, of ten and a half feet lift, (being the last proposed are located near M'Clurg's house, two miles above Pittsburg, and will flow the water back to Pine Run. This point for the location of the dam, was adopted as being the last shoal water on the river. From this dam to Pittsburg, the depth of the water was sounded, and ascertained to be sufficient for steamboats in the lowest water. The great width of the river at this place will render the construction of a dam laborious and expensive. Yet its locality cannot be favoured, unless by a dam across the Ohio, with a view to the improvement of that river, and of the harbour of Pittsburgh, in which case this dam can be removed up to Bigg's ripple, where its length would be diminished 390 feet, The lockage two feet, and its cost $15,700.

I have thus shown the localities of the dam, as selected during our examination, and which from observations taken at that time, and reflection since, I consider decidedly best calculated to render the improvement complete, permanent and economical. With the exception of the mills already mentioned, no other injury will be done by the required elevation of the water, for the whole distance examined. The length of the pools will average ten miles and 70

chains, and will afford (if the dams should be constructed at their present localities) a beautiful surface for the operation of steam boats.

The banks of this river are in many places lined with trees which grow near to the waters edge; these would, after the water is raised to its proper height, decay and fall into the river, and at their fall might be productive of much inconvenience, and possible injury, it is therefore proposed to cut them off, and remove them previous to the construction of the dams; for which purpose a sum as an equivalent for their removal, has been placed in the estimate; this it is also believed will be sufficient to do the grubbing, and to remove the few snags which are now scattered along the river.

The dams proposed on this river are commonly known by the name of crib and frame dams. The bottom of the dam to be built in the form of crib work, and the top of frame work, the whole to be filled in with loose stone; the frame work to be constructed of white oak, and the crib work of oak, or yellow poplar. A correct plan with all the necessary descriptions can be seen by reference to map No. 22 in the atlas. This plan differs from the one proposed on the Allegheny, and is recommended as possessing great strength, being easily secured, and requiring less timber than the Allegheny dams, a material which is not so easily obtained here as in that river.

The plan of the locks on this river is the same as proposed on the Allegheny, to wit: the wall of stone, the top of which are to be eight feet higher than the tops of the dams, the chamber to be 120 feet in length, and 26 feet in width; the form to be the same as the locks now constructing on the Pennsylvania canal, with the exception of the outside next the river, which will present a smooth surface to resist the action of ice or floodwood. The dimensions of these locks are proposed for the same reasons mentioned per Allegheny report. By a reference to the maps, the localities of all the dams and locks as above described, will be seen, together with all the ripples, which it is proposed to overcome by each of the dams, and all the villages situated on either side of the river, which will be benefitted by the proposed improvement.

It may here be well to remark that crib locks filled with stone, can be built on this river for $800 per foot lift, this plan (although the lock would be possessed of great strength, and doubtless last for several years) cannot be recommended on a river where stone of a good quality are so abundant as on this. Stone locks could be built remarkably cheap on this river but for the great expense to be encountered in preparing the foundation of them below the river surface.

The following table will show the length of the dams, and their height measured from the bed of the river; also their cost, with a recapitulation of the numbers and localities of dams, locks, &c.

The estimate for the dams includes the wing walls, excavation, &c.

Dams. No.	Locks. Nos.	Lift of Locks. Feet.	Localities. Names.	Length of Dams. Feet.	Height of Dams. Feet.	Cost of Dams. Dolls.	Cost of Pounds Dolls.
1	1 & 2	6 each	New Geneva.	580	14	16,020	1,325
2	3 & 4	6 each	Sharpneck's mill.	545	13	14,810	1,372
3	5	8	Millsborough	720	9	16,590	2,356
4	6	8¼	Bridgeport.	660	12	17,220	
5	7	7	Cookstown.	760	9	16,415	
6	8	8½	Parkerson's lower ripple.	785	12	19,745	
7	9	8½	Pine Run ripple.	660	11	16,460	
8	10	10½	Near M'Clurgs, two miles above Pittsburg.	1320	13	39,656	
				Cost of Dams,		156,916	5,553
				Pounds,		5,553	
			Add 75 feet of lockage, at $ 1,300 per foot,			97,500	
			Grubbing and clearing along the banks,			6,350	
			Removal of wing dams,			1,676	
			Damage of mills,			8,500	
			Walling below the locks,			2,400	
						278,895	
			Add 10 per cent.			27,889	
			Total cost,			306,784	
			If crib locks be adopted, the cost will stand,			$ 265,534	

EDWARD F. GAY, *Engineer.*

OHIO REPORT.

In compliance with instructions received in relation to an improvement of this river by locks and dams, our examinations were commenced at Pittsburg, and terminated at the foot of Stone's Island, immediately below the mouth of Beaver.

The depth of water assumed for this improvement is 4 feet. This was done from the conviction that whenever there was sufficient water for steamboats to come up to Beaver, there would also be an abundance of water in the navigation.

The first obstruction which presents itself to the progress of boats drawing four feet water, is a bar at the mouth of the Monongahela river. This bar extends quite across the river, and the depth of water on it during summer months does not exceed three feet. Accordingly the levelled line for the top of dam No. 1 was calculated at an elevation sufficient to raise one foot on to the present surface at Pittsburg.

The distance from Pittsburgh to Beaver, is 25¾ miles, and the fall (to the foot of Stone's Island) is 34 feet. To this add one foot, which it is proposed to raise at Pittsburg, and the lockage will stand 35 feet. This fall it is proposed to overcome by 4 dams and locks, located as follows.

Dam No. 1, being in two parts. The first part at the head of Nevill's island, and across the north channel. This part will be 1060 feet long and 7 feet high. The second part is across the south channel, and its position 1¼ miles above the lower end of the island. This part will be 660 feet long, and 13 feet high. Lock No. 1 of 8 feet lift is located at this place. This location for a part of the dam and the lock was suggested by the desire of accumulating as much fall as possible at this place, as a convenient position for the lock could not be obtained on the north side of the island.

Dam No. 2, with lock No. 2 of 8 feet lift, are located at Wolrey's trap ripple. The length of this dam will be 1040, and its height 13 feet; its position is favourable.

Dam No. 3, and lock No. 3, of 8 feet lift, are located at the foot of Deadman's ripple, a rock bottom is obtained for the lock, the length of the dam is 1050 feet, and its height 14 feet. As a great proportion of the fall on the distance examined, is accumulated between the head of Nevill's island, and the foot of Deadman's ripple; the pools between the 3 dams above noticed, will therefore be but about two and a half miles each in length.

Dam No 4, and lock No. 4, of 11 feet lift, are located at the foot of Stone's island. The length of the dam is 1320 feet, and its height 13 feet. The position of this dam would be much favoured by its location on a bar, near the residence of General Lacock; but in such case its connexion with any improvement up the Beaver, would be attended with considerable difficulty. The point at present selected, may therefore be considered with a view to that subject, as most favourable.

The height of the dams as given above are located from the bed of the river. The plan of the dams, the same as proposed for the Monongahela river. The locks to be built of stone, and to be 140 by 40 feet in the chamber; being calculated for the largest boats that come up to Pittsburg. The great width and height of the gates will render machinery necessary to open them.

By a reference to the maps, the localities of all the dams, and also the names of the ripples overcome by each of the dams will be seen.

The following estimate has been made out with a view to the difficulties to be encountered in the construction of both of the locks and dams.

Dams.	*Localities.*	*Cost.*
No. 1	(Both parts included) Nevill's island	$87,685
2	Wolrey's Trap ripple	$1,210
3	Deadman's ripple	$4,505
4	Foot of Stone's island	$9,650
		$143,050
	Add 35 feet of lockage at $1,600 per foot	56,000
	Add excavation below locks No. 3 and 4	2,130
		201,180
	Add 10 per cent	20,118
	Total cost	$221,298

It may be proper to remark before closing this report, that the city of Pittsburg at present suffers much from the want of a harbour on the Allegheny side of the town. A broad gravel beach extends the whole length of the city on a level with the surface of low water, and renders the landing of boats a subject of great inconvenience, in addition to which, the current of the Allegheny is so strong, that during high freshets, it is not without much difficulty that the landing of lumber can be affected. In frequent instances rafts are hurried along by the velocity of the current, for a considerable distance down the Ohio. When their return is only affected by the loss of time and money to the owner. To remedy these inconveniences, to make a perfect harbour on each side of the city of Pittsburg, to benefit the outlets from the canal into the Allegheny and Monongahela rivers, and to render navigable the whole width of these rivers, at this point, in low water, can best, and only be affected, by a sufficient elevation of the proposed dam, at the head of Nevill's island, to flow 4 feet on the common surface of low water at Pittsburg. This done, and with a harbour, it will in point of beauty and safety, be surpassed by none in the western country.

The above has been suggested, as in assuming the level for the top of dam No. 1, no particular reference was had to the harbour

of Pittsburg, further, than the raising one foot additional water on the bar at the mouth of the Monongahela.

All which is respectfully submitted,

EDWARD F. GAY, *Engineer.*

December 3d, 1828.

Series 9.

Minutes of the board of canal commissioners of Pennsylvania, from March 25th to August 21st, 1828, inclusive.

Harrisburg, March 25th, 1828, 7 P. M.

The board met in pursuance of notice from the president.

Present, David Scott, Esq. president, Messrs. Roberts, Phillips, Clarke, Enock, Lacock and Mowry.

A report from Dewitt Clinton, engineer, upon the completion of the Juniata division, together with a map and plan of an aqueduct, was received.

The following resolutions having been offered by the president, were unanimously adopted:

Resolved, That the acting commissioners and superintendants be a committee to inquire what amount of funds will be required to prosecute the works prior to the first of August next, and at what times, and in what proportions, it will be so required—to report to-morrow.

Resolved, That Messrs. Roberts, Enoch, Scott and Montgomery, be a committee to form and report to the board, a plan for active operations during the ensuing season.

Resolved unanimously, That the board do now adjourn to 3 o'clock to-morrow afternoon.

Adjourned to to-morrow at 3 P. M.

Harrisburg, March 26th, 1828.

3 P. M.—The board met.

Present Mr. Montgomery and all who were present yesterday.

Mr. Roberts, from the committee appointed yesterday to form a plan for active operations during the ensuing season, made the following report:

1st. That the particular direction of the railway from Philadelphia to York, and the general charge of the canal from Swatara to Columbia, and of the survey from Columbia to Conestoga, be assigned to Major Wilson. That Mr. Kneass have charge of completing the eastern division, of the extension to Columbia, and the

survey to Conestoga, subject in regard to the eastern division to the occasional directions of Mr. Rawle, and with regard to the rest, to the directions of Major Wilson.

2d. That Mr. Whippo be appointed engineer of the North Branch line.

3d. That Mr. Rawle be appointed engineer of the West Branch line.

4th. That Col. Clinton make the new location on the Juniata; that an arrangement be made, if possible, to furnish him with a competent assistant on the new survey, and to retain Mr. Morrell and Mr. Pursell on the lower line. That Col. Clinton, previous to fixing the upper Juniata line, shall make the necessary examinations through Kishacoquillas valley.

5th. That Mr. Harris and Mr. Livermore be engineers of the line from Pittsburg to the highest point practicable and expedient on the Conemaugh, the duty to be divided between them, under the directions of Gen. Lacock. That each be furnished with such assistants as may be necessary.

6th. That Mr. Sargent be directed to complete the Delaware location as far as Easton—that he be furnished with a competent assistant to take charge of that part of the line now under contract, during his absence above; that the superintendant of the Delaware division be authorised to put under contract the portion from Taylorsville to New Hope as soon as practicable and expedient, and also to contract for such stone and wood work between Bristol and Taylorsville, as in the opinion of the engineer, can be advantageously executed within the present season.

7th. That Mr. Ferguson continue in charge of the French creek feeder, and be directed to prepare the remainder of it for contracts. That if necessary, he also be requested to make the survey from Pittsburg to Beaver.

8th. That Mr. Roberts be offered employment in the service of the commonwealth, and in case he accept, that the location of the portage line across the Allegheny mountain, and the survey through Bedford county and Woodcock valley be assigned to him.

9th. That Mr. Gay be employed, if he consent to serve, to make the survey required by law, on the Allegheny, Monongahela and Ohio.

10th. That an effort be made to induce major Douglass to execute the survey from Carpenter's point to Easton.

11th. That Mr. Robinson be employed if possible, to execute the several rail road examinations between the Susquehanna and the waters of the Delaware.

12th. That Mr. Guilford continue in charge of the Susquehanna division.

13th. That the questions relating to the connexion of the Susquehanna and Juniata divisions, and to the size of locks on the Juniata division, be determined at the present session of the board;

14th, That a competent person be employed on each of the new lines of canal, to obtain releases and to perform the other duties relating thereto, required by the fifteenth section of the late act of assembly. That it shall be the duty of such persons to precede the locating engineer with a view to absolute releases, and to follow him on the line of his location in order to ascertain the amount of damages occasioned or claimed.

15th, That the acting commissioner of the western division have power when he deems it necessary, to appoint a competent person to superintend and keep in repair the finished portions of that division. That he shall report such appointment for approval by the board at the first meeting thereafter.

16th. That the appointment of collecters and lock keepers be referred to the next meeting of the board.

17th, That the direction of the line from Blairsville to the highest point practicable, &c. on the Conemaugh, and of the Portage surveys across the Allegheny mountain be assigned to general Lacock.

That the superintendent of the Juniata division have charge of the new survey and location on the Juniata.

That the superintendent of the French creek feeder be charged with its extension to Coneaut lake; and the superintendent of the Delaware division, with its extension to Easton.

That all other surveys be conducted under the general direction of the secretary.

That measures be taken to commence the several surveys and locations as soon as practicable, and that the engineers charged with the location of new lines be required to inform the board at their next meeting, at what time such lines will be ready for contract.

18th, That the president and secretary be authorised to employ a suitable person to make the rail road examinations between the Susquehanna and Chambersburg, and that they be also authorised to fill any vacancies which may arise, and to supply any deficiencies in arrangements for surveys during the recess of the board.

The said report having been read by sections and the question being taken separately thereon, it appeared that the whole report was unanimously agreed to.

A communication from Dewitt Clinton, engineer, in relation to the size of locks on the Juniata division, was received and read.

The following resolution was then offered for consideration:

Resolved, That the resolution of the board, of the twenty fifth December last, enlarging the dimensions of the locks on the Juniata division, be now rescinded and that the origional resolution on that subject be revived.

The question being taken on this resolution, the yeas were Messrs. Enoch, Clarke, Montgomery, Roberts, Phillips and Scott. Nays, Messrs. Lacock and Mowry.

So the resolution was agreed to.

The committee appointed yesterday, to inquire what amount of funds, &c. will be required for the purposes of the canals, reported the following resolutions, which having been read, were unanimously adopted.

Resolved, That his excellency the Governor be informed, that there will probably be required, for the construction of canals and the survey of canal routes, the sum of eight hundred and sixty thousand dollars, by the first of August next, in equal monthly instalments on the first of each month. And that the balance of the two millions appropriated, will probably be required in similar monthly instalments by the first of February next.

Resolved, That his excellency the Governor, be requested to draw his warrant in favor of the treasurer of the board, at the times and for the instalments in the foregoing resolution named, to be placed with the treasurer of the board, subject to the orders of the several acting commissioners and superintendents, and to the necessary warrants for the purposes of surveys.

Resolved unanimously, That the agreement made by A. Lacock, acting commissioner, with James M^c^ibbin to pay thirty-eight dollars for damages done to his property on the Kiskeminetas division be confirmed.

A memorial from William Ayres, on behalf of the creditors of A. M'Hargue, a contractor on the eastern division, was read and referred to the acting commissioner for that division, with instructions to report to-morrow.

A petition from Arthur M'Gill, asking compensation for expenses incurred in transportiug the mail, in consequence of injury done to the road on the western division, was read and referred to the acting commissioner of that division.

Adjourned unanimously to 10 o'clock, to-morrow morning.

Harrisburg, March 27th, 1828.

10 A. M.—The board met. Present as yesterday.

The following preamble and resolutions were offered and unanimously adopted.

Whereas by a resolution of the board passed on the 7th May, 1827, the engineers engaged upon surveys are respectively authorized to employ a waggoner at wages not exceeding $2 50 per day. And whereas in the survey of the North branch, a boat was found to be most convenient, and its construction was authorized by the president of the board, and whereas the nature of the country on the Delaware survey required the use of a boat for a large portion of time, and other means of transportation were occasionally resorted to:

Resolved, That the payments made for the purposes aforesaid, to wit: the sum of $ 279 51 by John Randle, jr. and the sum of 3[illegible] by Henry G. Sargent, the same not exceeding the said allowance for a wagoner, be and are hereby confirmed and approved.

The superintendent of surveys laid before the board, the account of John Handle, jr. for expenses on the North branch survey, amounting to $5082 36, of Charles T. Whippo, for those of the Beaver and Shenango, Alleghany Summit and lower Susquehanna surveys, amounting to $ 2,587 4[illegible], of John Wilson, for expenses on the Chester and Lancaster surveys, amounting to $ 2999 69, of William Wilson, for expenses on his survey on the Alleghany summi, amounting to $ 952 62 and of John Mitchell, for expenses of his survey on the same summit, amounting to $ 1019 79, which having been examined Resolved unanimously, that the said acounts, and the several allowances therein made, be approved and confirmed.

A memorial from the contractors on the French creek feeder, complaining of the interpretation placed upon their contracts by the engineer, was read and referred to the superintendent and engineer.

A memorial from Dr. Bemis in relation to the supply of water for the French creek feeder, and from the citizens of Meadville asking for a basin at that place, were read. Whereupon it was *Resolved unanimously* That it is not expedient to diminish the capacity of the French creek feeder. That the other matters contained in said memorials, be referred to the engineer, with instructions to report thereon at the same time, with his report on the final location of the feeder.

Mr. Lacock, to whom was referred the petition of Arthur M'Gill, made report, whereupon it was *Resolved unanimously*, That the report on the application of Arthur M'Gill, be referred back to the same committee, with instructions to enquire and report upon the following matters.

1. At what period the applicant contracted for the transportation of the mail.
2. At what time, and for what period the road was impassable.
3. Whether there be any law which would authorise the board to pay damages in any case, under the circumstances of that of the applicant. And generally any fact which will enable the board to come to a just decision of the matter.

Report to be made to the next meeting.

Mr Lacock presented a report from James D. Harris engineer, on the situation of the western division, and from Alonzo Livermore, engineer on that of the Kiskiminetas division.

Mr. Mowry as instructed made a report in writing, upon the memorial of the creditors of Alexander M'Hargue, which was ordered to lie on the table.

A communication from the Hon. Daniel Sturgeon, and other members of the Legislature representing districts bordering on the Monongahela, was read and referred to Messrs. Roberts, Lacock and Montgomery.

Resolved unanimously, that the contract made by C. Mowry, acting commissioner, with Alexander Chambers, to pay one thou-

sand dollars damages. for destruction of his ground, house, stable &c. on the Eastern division, and the contract made by the same commissioner, with Barbara Dubbs, to pay $350 for damages done to her property on the Susquehanna division, be approved and confirmed.

A memorial from citizens of Harrisburg, in regard to the road bridge at Market Street, was read, and it was *resolved*, That the board will proceed to view the bridge after the adjournment this afternoon.

A memorial from members of the Legislature from Lancaster county, asking that a basin may be constructed at the borough of Marietta, was read and laid on the table.

Resolved, unanimously, That the acting commissioners constitute a committee to fix the rates of compensation for the principal engineer, and to report thereon to-morrow morning.

Resolved unanimously, That the acting commissioner and superintendent on each division of the canal, be directed to report at the next session of the board, an organization of the assistant engineers, and inferior assistants on their respective divisions, with the names of the persons appointed, and the compensation proper to be allowed, for confirmation at that time.

Resolved unanimously, That the President request his Excellency the Governor, to draw his warrant on the Treasurer of the canal commissioners, in favor of the board, for the sum of five thousand dollars, for the purposes of the surveys about to be made under the act of the 24th of the present month.

Resolved unanimously, That the sum of ten dollars be allowed, and paid to Mr. Whippo, being the amount paid by him to Stacy Potts for services in transcribing his reports of last season, which was accidentally omitted in the settlement of his account.

The following resolution having been read, was unanimously adopted.

Resolved, That the board with the approbation of Henry G Sargent, their engineer, if his excellency the Governor shall consent thereto, do now continue the location of the Delaware division of the Pennsylvania canal, from its present termination near Taylor's Ferry, to a point at or near the village of New Hope, according to the plan and report of the said engineer. That the dimensions of the canal and locks on the part now located, shall correspond with those already fixed for said division.

Resolved unanimously, That the superintendent of the Delaware division be authorised to employ a clerk when he deems it necessary, at a rate of compensation not exceeding $2 50 per day.

Adjourned by unanimous vote to to morrow morning at nine o'clock.

Harrisburg, March 28, 1828.

Present as yesterday. 9 A. M.

The following resolutions having been read, were unanimously agreed to

Resolved That the board with the approbation of Dewitt Clinton, their engineer, if his excellency the Governor shall consent thereto, do now complete the location of the Juniata division of the Pennsylvania canal, by extending the same from its present termination to a point on the right bank of the Juniata, near the upper end of the Onion bottom hill, designated in the draft of said Engineer as the middle place of crossing, thence by an aqueduct across the Juniata to Duncan's Small island, and thence to connect with the Susquehanna canal near the head of said island. That the dimensions of the canal and locks shall be the same as those already fixed for said division.

Resolved, That the superintendent of the Juniata division be directed to advertize for contracts, the portion of line located by the foregoing resolution, and that in regard to the aqueduct, he invite separate proposals for a structure of wood, stone and iron, to be laid before the board for their determination at its next session.

A petition from Mr. M'Namee, a contractor on the Eastern division, complaining of the measurement made by the engineer, and asking redress, was read; and it was

Resolved, That the said petition be referred to the acting commissioner with instructions to have a measurement made, and to report all the facts at the next session of the board.

A memorial from Charles Carson, asking for a bridge, &c. was read and referred to the acting commissioner of the Eastern division, with instructions to report at the next session of the board.

Mr. Roberts, from the committee appointed yesterday, to whom was referred the letter of the members of the legislature, from counties bordering on the Monongahela, made report, That they consider it due to the gentlemen who have called the attention of the board to the importance of the survey on the Monongahela as well as to the interests of the population contiguous thereto, and of the commonwealth, that the said survey should be promptly executed by an engineer of competency and experience.

The committee are gratified to recognize in Mr. Gay, whose name has been placed before the board with strong recommendation, and who has already been designated for that service, these requisites,

Mr. Gay's merits stand further attested by the skill and competency which he has displayed in the construction of the Conestoga navigation.

The said report having been read was unanimously accepted, and the secretary was directed to furnish a copy of the proceedings on this subject, to the gentlemen interested.

Resolved unanimously, That to each party engaged on surveys or in exploring, a wagoner or a pack-horseman be allowed at a rate of compensation not exceeding $3,00 per day.

Resolved unanimously, That the acting commissioners and superintendents on the several divisions of the Pennsylvania canal, be directed to pay the salaries of the principal engineers on such

divisions, from the dates to which they have been respectively paid, by warrants on the Treasurer of the improvement fund.

The memorial of Benjamin Herr, in regard to damages suffered by him on the Western division, was read and referred to Messrs. Lacock and Enoch.

A written communication from James Clarke, esq. a member of the board, was read, whereupon the following resolution was unanimously adopted.

Resolved, That William B. Mitchell, Esq. who was employed by James Clarke, esq. superintendent upon the Juniata division of the Pennsylvania canal, as an agent to assist him in the performance of his duties, during his indisposition, be allowed at the rate of $2 50 per day from the 5th of January to the 22d day o March, 1828, the period in which he was actually engaged in the service of the board.

Resolved unanimously, That the acting commissioners and superintendents on the several lines of canal now under contract, shall have power at their discretion, and when they shall deem it advisable, to relax the rule which requires that 20 per cent. upon the estimate of the contractor's work shall be retained as security for the performance of the contract.

A communication from George Harrison, John Matts, John Foulkrod, Benjamin Martin, Peter Ihrie, John Fackenthall, Joseph Hergesheimer, Abraham Miller, William H. Rowland, William Lehman and Samuel J. Peirson, Esquires, members of the Legislature, asking that stone locks may be constructed on the Delaware division was read, whereupon the following preamble and resolution were unanimously adopted.

Whereas a number of the members of the legislature have joined in a memorial to the board, requesting that the locks upon the Delaware canal may be constructed of stone instead of wood, as proposed by the engineer upon the line, therefore,

Resolved, That the superintendant and engineer on the said line be instructed to examine and ascertain whether suitable stone can be obtained on or near the said line, and make report at the next meeting of the board upon the subject. And also that the said engineer report at the same time a comparative estimate between stone and wooden locks.

Adjourned by unanimous vote to 9 o'clock, to-morrow morning.

Harrisburg, March 29th, 1828.

9 A. M.—Present as yesterday.

Mr. Mowry, acting commissioner, presented for confirmation the following agreements for damages, viz: With Peter Pancacke for $55, with George Mish for $60, with John Shoch for $60; and it was

Resolved unanimously, That the said contracts approved and confirmed

Mr. Phillips, superintendant, presented for confirmation the following agreements for damages, viz.: with David Compton, James E. Randolph and Simeon Shoemaker; and it was

Resolved unanimously, That the said contracts be approved and confirmed.

Mr. Phillips also presented agreements for damages with A. M'Gaw, John Dickson and Timothy Alden; which, on motion, were referred back to him with instructions to ascertain the facts and report the same at the next session of the board.

Resolved unanimously, That the acting commissioner on the western division of the Pennsylvania canal be instructed to advertise and contract for the construction of an outlet river lock on the Conemaugh section of canal—the lock to be situated in the dam, a short distance above the town of Blairsville, in the county of Westmoreland.

Resolved unanimously, That the resolution in relation to the pay of principal engineers be continued, and that the committee appointed on that subject be instructed to report at the next meeting of the board.

Resolved, That his excellency the Governor be requested to give notice to the gentlemen who shall be appointed canal commissioners from the first of June next, to meet at this place on the second day of June, 1828, at 10 o'clock, A. M.

Resolved, That Samuel H. Kneass be appointed an engineer in the service of the board, at the rate of $4 a day, to commence from the date when Mr. Rawle resigns the immediate charge of the eastern division.

Harrisburg, June 2d, 1828.

10 A. M.—In pursuance of a notice from the governor of the commonwealth, Thomas Enoch, Charles Mowry, Jonathan Roberts, John Phillips and Daniel Montgomery, attended as canal commissioners, and having respectively presented their commissions, were organized by the appointment of David Scott, Esq. as president pro tempore, and Joseph M'Ilvaine as secretary, pro. tempore.

Resolved unanimously, That the board adjourn to 9 o'clock to-morrow morning, at which time they will proceed to the election of officers for the ensuing year.

Adjourned to 9 o'clock, to-morrow morning.

Harrisburg, June 3d, 1828.

9 A. M.—The board met according to adjournment.

Present, Messrs. David Scott, Daniel Montgomery, Thomas Enoch, Charles Mowry, John Sergeant, Jonathan Roberts, Abner Lacock and John Phillips.

Messrs. Sergeant and Lacock presented their commissions, which were severally read.

The oath of office prescribed by law having been administered to the members of the board respectively, it was

Resolved, That the board do now proceed to the election of a president and secretary for the ensuing year.

On counting the votes it appeared that David Scott, Esq. was unanimously re-elected president, and that Joseph M'Ilvaine, Esq. was unanimously re-appointed secretary of the board for the ensuing year.

A written communication from Mr. Scott, positively declining to accept the office of president, was received and read.

Whereupon it was

Resolved unanimously, That Daniel Montgomery, Esq. be elected president of the board in the place of Judge Scott.

The following resolution, offered by Mr. Sergeant, was then unanimously agreed to:

Resolved, That the board have accepted with regret the resignation of Judge Scott as president, and return him their sincere thanks for his valuable services, and for the kind and conciliating manner in which he has performed the duties of his office.

The superintendent of surveys laid before the board two accounts of D. B. Douglass, engineer, showing the expenses of the survey under his direction, from Conneaut summit to lake Erie, amounting to $ 1,644 76, which having been examined,

Resolved, That the said accounts be approved and confirmed.

The president and secretary laid before the board an account of the disbursement of the survey fund, showing an expenditure since the last settlement at the treasury, of $18.355 37, and a balance remaining of $ 35 96. The said account having been examined, and compared with the vouchers, and being ascertained to be correct, it was

Resolved, That the several items in the said accounts be approved and confirmed, and that the same be presented to the accounting officers for allowance.

Resolved unanimously, That the president request his excellency the governor, to draw his warrant on the treasurer of the canal commissioners in favor of the board, for the sum of five thousand dollars, for the purposes of the surveys about to be made under the act of 24th March, 1828.

The following resolution having been offered by Mr. Roberts, was unanimously adopted:

Resolved That a committee be appointed to inquire into the state of the construction of the eastern division of the Pennsylvania canal, and into the causes of delay in completing it before this time, and at what time it can be finished, as well as at what time Mr. Dibble's contract for finishing the guard locks and the section immediately below, is to be executed, and to make report.

Messrs. Roberts, Lacock and Sergeant were named to compose the committee.

A communication from the board of directors of the Union canal, was read and referred to the same committee.

Resolved unanimously, That the president and the late president be a committee to consider and report to the board, what business requires their attention at the present session, and the order in which it ought to be taken up.

Mr. Mowry, acting commissioner, presented for confirmation the following agreements for damages on the eastern and Susquehanna divisions, to wit: with John Mahon for $120. John Geiger $150, Peter Keller $25, Catharine Early $125, Thomas Elder $90, Samuel Whitman $200, Robert Fox $150. Peter Ritner $200: Henry Lackey $8 a day for the stoppage of his mill; which agreements having been read,

Resolved unanimously, That the same be approved and confirmed.

Mr. Phillips, superintendent, presented for confirmation the following agreements for damages on the French creek feeder, viz: with Alexander Shaw for $230, with Francis Ross for $240, with William A. V. Magan $150, John Dickson $85; which agreements having been read,

Resolved unanimously, That the same be approved and confirmed.

The superintendent of the Delaware division submitted for confirmation, an agreement made by him with James Johnson of Bristol, to convey to said Johnson in full compensation of damages done to his land by the passage of the canal through the same, one acre and fifty six perches of land, cut off from the lots of Ann Gregg, Samuel Hibbs and William Kinsey, and by those persons conveyed to the commonwealth. Whereupon it was

Resolved, That the said agreement be approved and confirmed, and that the superintendent of the Delaware division be instructed to convey to the said Johnson all the right, title and interest of the commonwealth in the said one acre and fifty six perches of land, as derived from the said Ann Gregg, Samuel Hibbs and William Kinsey.

Adjourned to 3 o'clock this afternoon.

Harrisburg, June 3d, 1828.

3 P. M.—The board met.

Present Daniel Montgomery, Esq. president, Messrs. Sargeant, Lacock, Mowry, Enoch, Roberts and Scott.

Resolved unanimously, That the salary of the secretary of the board be two thousand dollars per annum, commencing from the 10th day of April last, as a full compensation for his various services.

A report from C. T. Whippo, engineer, upon the location of the North Branch canal, was received and read.

Messrs. Phillips and Clarke appeared. The latter gentleman having produced his commission, and taken the oath prescribed by law, took his seat as a member of the board.

Mr. Lacock, acting commissioner, presented for confirmation the following agreements for damages on the lines of canal under

his care, viz: with William Dunlap $250, John Gallagher $50, Enoch Jones $72 50, Crawford M'Kee $580, Michael Resher $30 Shelton M'Farland $35, James Munden $50, James Gallagher $20; which agreements having been read,

Resolved unanimously, That the same be approved and confirmed.

Mr. Lacock made a further report on the case of Arthur M'Gill, referred to him at the last session of the board, which being read, was laid on the table.

On motion,

Resolved unanimously, That a committee be appointed to consider and report upon the compensation proper to be allowed to engineers and assistant engineers.

Whereupon Messrs. Scott, Roberts and Enoch were appointed.

The several acting commissioners and superintendents made reports of the organization of the engineer department upon their respective divisions, which were referred to the committee just appointed.

Several communications from citizens residing near the line of the French creek feeder, urging its completion, and complaining of delay were read.

A report from Mr. Mowry, acting commissioner, upon the situation of the Eastern and Susquehanna divisions was read.

A report from Mr. Lacock, acting commissioner, upon the situation of the Western and Kiskeminitas divisions was read

A report from Dewitt Clinton, engineer, upon his survey of a canal route through Kishacoquillas valley, shewing the impracticability of the proposed communication, was read.

A communication from Messrs. Shoenberger, Scmuchee and Spang, iron masters, on the Juniata, was read.

Communications from citizens on the North Branch of Susquehanna, asking that the canal along that river may be commenced at the state line, were read.

Resolved unanimously, That it is not expedient to commence the North Branch canal at the state line, and that such a commencement, in the opinion of the board, would not be consistent with the intentions of the legislature.

Adjourned to to-morrow morning at 9 o'clock.

Harrisburg, June 4th, 1828.

9 A. M.—The board met. Present, all the members but Mr. Mowry.

A communication from Mr. Guilford, recommending the appointment of some competent mechanic to superintend the dam at Shamokin ripples, was read.

Resolved unanimously, That the several acting commissioners and superintendents be authorized to appoint, when they deem it necessary, superintendents of stone and wood work, at a rate of compensation not exceeding $ 3 a day, having due regard to the

resolution of the board of 2d June, 1827. Such appointments to be reported to the board at the first meeting thereafter.

Resolved unanimously, That the board, with the approbation of Charles T. Whippo, their engineer, if his excellency the governor shall consent thereto, do now locate in part the North Branch division of the Pennsylvania canal: Beginning at the end of the forty fifth mile from Northumberland on the west side of the North Branch, and extending thence down the said river a distance of eighteen miles. That the dimensions of the canal and locks on the part now located shall correspond with those on the Susquehanna division, as already fixed.

Resolved unanimously, That the engineer on the North Branch be instructed to prepare, and the superintendent who may be appointed for that line, to advertise for contracts the line of canal located by the foregoing resolution, and also the line of a feeder necessary to obtain a supply of water from the Nanticoke falls.

A report from Mr. Guilford upon the practicability of connecting Penn's creek with the Pennsylvania canal, was read, and it was

Resolved unanimously, That the engineer of the Susquehanna division be instructed to form a connection between that division and Penn's creek, by means of a wooden lock, as recommended in his report on that subject, and that the acting commissioner make a contract accordingly.

Resolved unanimously, That the communications in regard to the French creek feeder be referred to the committee appointed to inquire into the state of the Eastern Division.

Resolved unanimously, That the superintendent of surveys be directed to instruct the engineer of the French creek feeder to complete its location, and report the same for the final decision of the board, by the next meeting of the board.

Resolved unanimously, That the President be requested to make further inquiries for an engineer, to execute the rail road surveys west of the Susquehanna, and be authorised to make the necessary engagements.

A report from Mr. Clinton in regard to the plan of erecting an aqueduct over the Juniata, for the purpose of connecting the Juniata with the Susquehanna division, was read and referred to Messrs Sargeant, Lacock and Clarke.

Harrisburg, June 5th, 1828.

Present all the Board.

Mr. Lacock, acting commissioner, made report upon the situation of Dam No. 1, on the Kiskiminetas division, and asked the confirmation of a contract made by him, for repairing the injury done to that Dam by recent floods.

Resolved unanimously, That the said contract be approved and confirmed.

The committee appointed to consider the salaries proper to be allowed to engineers and assistants, made report.

Whereupon it was moved, and *unanimously Resolved*, That Messrs. Roberts and Douglass, be paid at the rate of $2500 a year, while in the service of the board.

It was then moved that the salary of Mr. Clinton be $2000 a year. On a motion of Mr. Clarke to amend by inserting $2250, instead of $2000, the yeas were Messrs Clarke, Scott and Mowry, 3, the nays Messrs. Lacock, Phillips, Sargeant, Enoch, Montgomery, Roberts, 6. So the motion to amend was lost. The question recurring on the original motion, it was unanimously decided in the affirmative.

On motion, That all other principal engineers, except Mr. Kneass, be allowed at the rate of $2000 a year, Mr. Scott voted in the negative and all the other members in the affirmative. So the motion prevailed.

Resolved unanimously, That the salary of Mr. Kneass, as engineer, be $1460, a year.

On motion, That the salaries of Messrs. Morrell, Harris, Scott, Bennet, M'Ilvaine and Hage, principal assistant engineers, be at the rate of $4 00 a day, the yeas were Messrs. Roberts, Montgomery, Sergeant, Mowry and Clarke, 5; the nays Messrs. Lacock, Scott, Phillips and Enock 4. So the motion prevailed.

On motion, that the compensation of Messrs. Purcell, Twining, Lacock, Foster, Petrie, Merrick and Mills, principal assistants, be at the rate of $3 50, per day, the yeas were Messrs Roberts, Scott, Montgomery, Sergeant, Enoch, Mowry, Clarke, 7 nays Messrs. Lacock and Philips 2. So the motion prevailed.

On motion, That Messrs. Faries, Rodrigue and Byers, be allowed as principal assistants, at the rate of $2 75 per day. All the members voted in the affirmative.

Resolved unanimously, That the allowance to sub-assistants and draftsmen, in all cases be $2 00 per day, and to target men, $1 50 per day.

Resolved unanimously, That the pay of principal assistant engineers, at the rates now fixed, shall commence from the 10th of April last, or from such later period as their services in that capacity commenced.

The committee appointed to enquire into the state of the eastern division, made the following report, accompanied by reports from Mr. Kneas, engineer, and Mr. Groves, Superintendent of masonry.

The report of the engineer hereto annexed, shows the work to be in a state that will require the most vigorous and persevering exertions on the part of the contractors to complete during this season; the Guard Lock and upper sections, the commencement of which was unavoidably delayed, from the time required to make the necessary surveys, to enable the board to locate the feeder down at Duncan's Island. Since the contracts have been in a course of execution, that the state of the water has been very unfavourable to the progress of the work. Those impediments may be expected soon to disappear. The engineer is of opinion that

four hundred hands may conveniently work on the sections of Messrs. Dibble, Green and Cameron, and that they should be required to increase it to, and maintain their force at that amount. A good deal remains to be done as far as Stony creek, including the aqueduct over that stream, which has unfortunately not been prosecuted with diligence, from the mistaken idea that it was unnecessary, while the guard lock and upper sections were in progress. Below stony creek, though a considerable portion of the work remains unfinished, if it be prosecuted with a sufficient number of hands, it may be finished, in the opinion of the engineer, in two months.

The committee believe the outlet locks at the Swatara have been unnecessarily delayed, and it is now found that a large portion of the work now laid out, must be taken up and re-constructed. See the report of the superintendent of masonwork hereto subjoined. The public interest requires these locks should be completed in the shortest time possible, and that no further indulgence should be extended to the contractor. The public suffer daily the most serious inconveniencies, since the Union canal has been finished, for want of them. To permit the contract of the outlet locks to linger in execution as it has done for some time past, would bring disgrace upon the whole system of improvement, and upon the board. Among the causes which have operated to retard the completion of the eastern division of the canal, must be reckoned the extension of the supervision of the acting commissioner to the Susquehanna division, and the contractors below, having become interested in contracts on that division. The committee recommend that the completion of the eastern division be placed under the care of a superintendent, and that the whole attention of the acting commissioner be directed to the Susquehanna division, the Shamokin dam and bridge at Duncan's island, and that the said superintendent be directed to require the contractors to prosecute the execution of their contracts with such a number of hands as will enable them to finish the work at the earliest time, and that on their neglecting to keep up their force, to forfeit and re-let their contracts. The committee therefore submit the following resolutions.

1. *Resolved*, That a superintendent be immediately appointed to take charge of the eastern division of the Pennsylvania canal, and such other works as it may be found to de expedient to place under his care.

2. *Resolved*, That notice be given to the several contractors to employ on the work, at least the number of hands stated in the report of the engineer, and notice also that that they will be required to push on the execution of the work, and finish the same by the time he has mentioned, and that in case of default in either of these particulars, their contract will be declared abandoned.

3. *Resolved*, That the contractor for the two lower locks be required immediately to take down such part of the work as the

engineer shall direct, and to proceed without delay to rebuild the same in a substantial manner, employing the number of hands stated by the engineer.

4 *Resolved*, That in case of default by any contractor to employ the required number of hands, or to push on the work, or to complete it by the time designated, the contract shall be declared abandoned, and the work re let, unless the superintendent and engineer shall concur (for reasons to be stated to the board in writing) in excusing such default.

The question being taken on the report and resolutions separately, it appeared that they were unanimously agreed to.

Resolved, unanimously, That Mr. Groves be removed from the office of superintendent of masonry, on the eastern division.

The same committee made the following report in regard to the prosecution of the French creek feeder.

That the secretary promptly communicated the resolution of the board to have the survey and location of the new section of the Conneaut feeder executed, to the acting commissioner, who reports he handed the communication to the engineer, who has reported he would commence his survey and location on the first of this instant, and that it would be ready to be advertised in one month thereafter. They therefore consider it unnecessary for the board to take any further order on the communications from Meadville. Therefore they offer the following resolution.

Resolved, That the committee be discharged from the further consideration of the subject.

This resolution being read, was unanimously adopted.

Resolved, unanimously, That the board proceed to fix the number and stations of acting commissioners and superintendents.

Resolved, unanimously, That it is expedient to appoint three acting commissioners and five superintendents.

Messrs. Lacock, Clarke, Mowry and Phillips, had leave to withdraw during the choice of acting commissioners.

The following resolutions were then offered and unanimously agreed to by the five members present.

Resolved, That Abner Lacock be re-appointed acting canal commissioner for the canal along the Allegheny, Kiskiminetas and Conemaugh, and for the portage across the Allegheny mountain.

Resolved, That Charles Mowry be re-appointed commissioner for the Susquehanna division.

Resolved, That James Clarke be appointed acting commissioner for the Juniata division, from and after the 10th day of June, inst.

Messrs. Lacock, Clarke, Mowry and Phillips, having resumed their seats at the board, the following resolutions were unanimously agreed to.

Resolved, That William Wilson, of Lycoming, be appointed superintendent of the eastern division, and of the line from Swatara to Columbia.

Resolved, That Thomas G. Kennedy, be continued as superintendent of the Delaware division.

Resolved, That Thomas Woodsides, of Columbia, be appointed superintendent of the north branch division.

Resolved, That Andrew M'Reynolds, of Columbia, be appointed superintendent of the west branch division.

Resolved, That John Mitchell, of Centre, be appointed superintendent of the French creek feeder.

Resolved unanimously, That the engineers upon the new line of canal, be directed to construct locks of wood, or of wood and rough stone combined.

It was then moved, that the board at the close of its present session, shall adjourn to meet at Harrisburg, on the 18th of August next. The yeas were Messrs. Clarke, Montgomery, Roberts, Mowry, Phillips, Sargent. The nays were Messrs. Scott, Lacock, Enock; so the motion was agreed to.

Adjourned to this afternoon at 3 o'clock.

Harrisburg, June 5th, 1828

3 P. M.—Present all the members.

Mr. Lacock, from the committee on the Juniata aqueduct, made the following report.

The committee to whom was refered the subject of erecting an aqueduct across the river Juniata, near its mouth, and the plans and drafts furnished by the engineer, and the proposals of the several bidders for that contract, report: That after due consideration of the subject they have been induced to recommend to the board the adoption of plan No. 7 as most eligible. This plan proposes the erection of an aqueduct at that place; the abutments and piers of good substantial stone work, and the superstructure of wood. The committee would observe, that the erection of such an aqueduct would cost little more than half the sum that would be required to erect one entirely of stone, and they think the saving in point of expense in the erection of this building, a full equivalent for its want of durability, especially as the state of Pennsylvania, is not at this time engaged in works of a public nature of immence magnitude and extent, that must require a great portion of her pecuniary resources for their completion.

Resolved, That the acting commissioner be directed to contract for the erection of the aqueduct, on the plan aforesaid.

The foregoing report and resolution having been read, were unanimously agreed to.

Resolved, (Mr. Scott disenting,) That from the 1st of June inst. there be allowed to R. L. Reene, the sum of three dollars per day for his services as clerk on the western and Kiskiminetas division.

Several communications from Daniel Bemis and others, in and near Meadville, in regard to the surplus water of the French creek feeder, having been read, it was unanimously

Resolved, That it is not expedient at this time to take any order on the subject.

Resolved unanimously, That Messrs. William B. Foster and Christian Latshaw, be appointed collectors, the former to reside

at Alleghany town, on the westren division, and the latter at the Salt works on the Kiskiminetas division, and that before entering on their duty, they give sufficient security according to law.

Mr. Phillips having withdrawn from the meeting, a written communication from him inquiring the reasons for his not being appointed an acting commissioner, was received. The same having been read, the folowing resolutions were unanimously adopted.

Resolved unanimously, That the president be requested to inform General Phillips, in reply to his letter this day received, that as the act of last session prohibits the appointment of a commissioner to the office of superintendent, the board could not re-appoint him superintendent, and having decided that it was not expedient to appoint more than three acting commissioners lest they should thereby interfere with the spirit and intention of the act (which decision was approved by General Phillips,) they were reduced to the necessity of leaving out one of the commissioners heretofore employed, and upon a full view of all the circumstances, they thought that a change of the Conneaut line would occasion the least public inconvenience, and that if personal considerations could have any weight, the other members had the best claim to be retained, having all been appointed before general Phillips.

Resolved unanimously, That the acting commissioner of the eastern division, be requested to continue his services at his present station, until William Wilson, Esq. shall arrive, and be prepared to take upon himself the duties of superintendent, according to his appointment, and that the said acting commissioner be directed then to hand over and deliver to Mr. Wilson, all books, papers, drafts, and other things whatever, relating to that part of the line of which he has been appointed superintendent.

Resolved unanimously, That John Phillips, Esq. be and he hereby is directed to hand over and deliver to John Mitchell, Esq. appointed superintendent of the French creek feeder, as soon as the said John Mitchell shall be ready to take upon himself the duties of superintendent, all books, papers, drafts and other things whatever relating to the said line.

Resolved unanimously, That the acting commissioner on the eastern division of the Pennsylvania canal, be authorised to pay to James S. Espy & co. the sum of three hundred dollars, as compensation for the destruction of their distillery by the said canal; provided that the said James S. Espy & co. give a receipt in full of their entire claims for damages.

Resolved, That the superintendent of the Delaware, North branch, West branch and eastern divisions, and of the French creek feeder, be respectively authorised to employ a clerk at a rate of compensation, not exceeding $2 50 a day.

Harrisburg, August 18th, 1828.

7 P. M.—This being the day to which the board stood adjourned—Messrs. Mowry, Enoch, Phillips, Lacock and Clarke attended. Adjourned to 9 A. M. to-morrow.

Harrisburg, August 19th, 1828.

The board met.

Present Daniel Montgomery, Esq. president, Messrs. Sergeant, Lacock, Clarke, Roberts, Mowry, Enoch and Phillips.

A report from major Wilson on a survey and location of a part of the rail-way line from Columbia to Philadelphia, was read—whereupon the following resolution was unanimously adopted.

Resolved, That though the board perceive no reason to disapprove the location made by major Wilson so far as it goes, they do not deem it expedient finally to approve the same, until the examination shall be completed to the eastward, and the remainder of the location be reported.

A report from James Ferguson, engineer upon the extension of the French creek feeder, and a memorial from citizens of Meadville, in regard to a basin at that place, were presented.

Resolved unanimously, That the board with the approbation of James Ferguson, their engineer, (if his excellency the Governor shall consent thereto) do now continue the location of the French creek feeder, from its present termination near the mouth of the Conneaut outlet, according to the reports and draft of the said engineer, to Muddy run, a distance of ten miles and .96 That the dimensions of the part now located, shall correspond with those of the portion already begun.

A report from H. G. Sargent, engineer, upon the further extension of the Delaware division, was read.

Resolved unanimously, That the board with the approbation of Henry G. Sargent, their engineer (if his excellency the Governor shall consent thereto) do now continue the location of the Delaware division of the Pennsylvania canal, from its present termination near the village of New Hope, up the valley of the Delaware, according to the report of said engineer, to a point near Godfrey Raub's, being a distance of thirty-one miles. That the dimensions of the canal and of the locks necessary thereto, be the same already fixed for said division.

A report from C. T. Whippo, engineer, upon the location of the North Branch division, to Northumberland, was read.

Resolved unanimously, That the board, with the approbation of Charles T. Whippo, their engineer (if his excellency the Governor shall consent thereto,) do now complete the location of the North branch division of the Pennsylvania canal. Beginning at the end of the location made by resolution of June last, and extending thence acording to the plan and report of said engineer, to the junction of the north and west branches at Northumberland, thence to connect with the west branch division, and to communicate by

locks with the pool of the dam at Shamokin ripples. That the dimensions of the canal and locks correspond with those of the Susquehanna division.

Adjourned to this afternoon at 3 o'clock.

Harrisburg, August 19, 1828. 3 P. M.

Present as this morning.

A report from Col. Clinton, engineer, upon the extension of the Juniata division to a point near Huntingdon, and upon his survey of a route through Kishocoquillas valley, was read.

Resolved unanimously, That the board with the approbation of Dewitt Clinton, their engineer, (if his excellency the Governor shall consent thereto) do now continue the location of the Juniata division of the Pennsylvania canal; beginning at its present termination at Lewistown, and extending thence on the north side of the Juniata river, to the fording place opposite Hanawalt's farm; thence by aqueduct across said river, and up the south side thereof to the head of Jack's narrows, thence by aqueduct across the same river and up the north side thereof, to the end of the 45th mile from the place of beginning. That the dimensions of the canal and locks shall correspond with those already fixed for said division.

A report from N. S. Roberts, on the survey of a portage route across the Allegheny mountain, so far as it has advanced, was read.

A report from James D. Harris, engineer, upon the extension of the Pennsylvania canal from Blairsville up the Conemaugh, to a point near Blairsville, was read.

Resolved unanimously, That the board with the approbation of James D. Harris, their engineer, (if his excellency the Governor shall consent thereto) do now extend the Pennsylvania canal up the Conemaugh river from the outlet lock near Blairsville, according to the report of the said engineer, to a point one mile below the village of Johnstown. That the dimensions of the canal and locks on the portion now located, shall correspond with those of the western division.

A report from S. H. Kneass, engineer, upon the extension of the Eastern division, from the mouth of Swatara to Columbia, was read.

Resolved unanimously, That the board, with the approbation of Samuel H. Kneass, their engineer, (if his excellency the Governor shall consent thereto) do now continue the location of the Eastern division, from the outlet locks near the mouth of Swatara, down the east side of the Susquehanna river, to a point near the bridge at the borough of Columbia. That the dimensions of the canal and locks shall correspond with those already fixed on the Eastern division.

A report from Francis W. Rawle, engineer, upon the survey and location of a canal line on both sides of the West branch, accompanied by drafts and estimates, was read.

A number of memorials from citizens on both sides of the West Branch were received, and it was

Resolved, That the gentlemen interested in the question of location on the West Branch, be requested to present their views to the board in writing.

Mr. Kennedy superintendent of the Delaware division, presented for confirmation, the following agreements for damages to land. With heirs of Jesse Morris for $132 50, George Grubham $170 62, Samuel Vanghen $200 and also with Jacob L. Welton, to pay in lieu of bridge and fencing $315 28, with Mahlon Yardley, to pay in lieu of fencing $171 75, and with William Paff, to pay in lieu of fencing $177.

Resolved unanimously, That the said agreements be approved and confirmed.

Resolved unanimously, That the president request his excellency the Governor, to draw his warrant on the treasurer of the canal commissioners, in favor of the board, for the sum of five thousand dollars, to be applied to the purposes of the surveys now making or about to be made under the act of 24th of March, eighteen hundred and twenty-eight.

Resolved unanimously, That the acting commissioners and superintendents respectively, now in Harrisburg, be directed to lay before the board at the meeting to-morrow, a statement of the amount which will probably be required on their lines during the present season, for carrying on the work now under contract, and the time or times when the same will be wanted, and that the secretary be directed to ascertain and report the amount of money which will be in the treasury for the public work (after paying existing drafts) and when the same may be drawn.

A memorial from citizens of Harrisburg, asking that the towing path of the canal, where it passes through the borough, may be changed, was read.

Resolved unanimously, That the superintendent of the eastern division, be directed to cause a towing path to be made on the side opposite Harrisburg, according to the prayer of such memorial.

Mr. Lacock, acting commissioner, presented the following agreements for confirmation: with John Drummond, for damages to land $ 350, Skelton M'Farland, $ 400, Samuel Tilmage, for protection of salt works, Charles Bovard, for clearing off timber, Joseph Huster, for removing house $ 270, David Brenneman, for injury to salt works, $ 575, John Johnston for removing salt house $ 50.

Resolved unanimously, That the said agreements be approved and confirmed.

Resolved, That the board will proceed to-morrow to view the works on the eastern division, near the mouth of Juniata.

Adjourned to 5 o'clock P. M. to-morrow.

Harrisburg, August 20th, 1828.

5 P. M.—The board met. Present as yesterday.

A memorial on the subject of a basin at Meadville, being brought up for consideration it was

Resolved unanimously, That the superintendent of the French creek feeder, be authorized to construct a basin at Meadville, according to the request of the citizens, provided the commonwealth is indemnified against the payment of damages for land occupied by the basin.

Mr. Mitchell, superintendent of the French creek feeder, presented an agreement with John Gibson, to pay $ 450, for damages to land.

Resolved unanimously, That the said agreement be approved and confirmed,

Mr. Mitchell, presented also an agreement with John Reynolds, for the purchase of land injured by the canal, at the price of $ 100.

On motion

That such agreement be confirmed, the yeas were Messrs. Sergent, Mowry, Lacock, Roberts, Enoch, the nays, Messrs. Clarke and Montgomery.

So the agreement was confirmed.

Mr. Mitchell presented for confirmation, an agreement with Mr. Cooper, for the purchase of land injured by the canal, at the price of $ 200,

On motion

That such agreement be confirmed, the yeas were Messrs. Sergeant, Mowry, Lacock, Roberts, and Montgomery, nays Messrs. Enoch, and Clarke.

So the agreement was confirmed.

Resolved unanimously, That the clerk of the Juniata division, be allowed a compensation at the rate of $ 3 a day, from the 1st day of September next.

The board then proceeded to consider the questions relating to the location of a canal on the west branch of the Susquehanna.

The report of the engineer having been read with the memorials and written arguments of the citizens interested, it was

Resolved, That this question together with the documents be refered to a committee.

Messrs. Roberts, Mowry, and Phillips, were named to compose the committee.

Resolved unanimously, That the president be authorised to request his excellency the Governor, to draw his warrant on the treasurer of the canal commissioners, for such further sum or sums not exceeding in the whole, ten thousand dollars, as may be necessary for the surveys now making or about to be made under the act of 25th March, 1828.

Adjourned to 9 o'clock, to-morrow morning.

Harrisburg, August 21st, 1828.

9 A. M.—The board met. Present as yesterday.

The committee appointed to consider the question in regard to the location of a canal along the West Branch, made report:

That they have carefully read and considered the report of the engineer, and the representations of the committees appointed by the citizens interested, to address the board on the subject, and are clearly of opinion that the route along the eastern side is preferable, and should be adopted. They therefore propose the following resolutions:

Resolved, That the board with the approbation of Francis W. Rawle, their engineer, if his Excellency the Governor, shall consent thereto, do now locate the West Branch division of the Pennsylvania canal as follows: Beginning at a point near Sugar camp island, on the left bank of the West Branch and extending thence down said branch, according to the report and draft of said engineer, to the forks of the Susquehanna river, at Northumberland, there to unite with the North Branch division. That the dimensions of the canal and locks, shall correspond with those of the Susquehanna division.

Resolved, That a towing path and road bridge be erected across the West Branch at the town of Northumberland, with outlet locks from the North and West Branch canals into the pool of Shamokin dam.

The said resolutions having been read, were unanimously adopted.

Mr. Lacock, acting commissioner, presented for confirmation, a contract with J. Bills, to repair the damage occasioned by floods upon dam No. 2, on the Kiskiminetas division.

Resolved, unanimously, That the said contract be approved and confirmed.

Thomas Enoch, Esq gave notice to the board that he had resigned his office of canal commissioner, and withdrew from the meeting.

Mr. Wilson, superintendent of the Eastern division, presented for confirmation a contract with Daniel Books, to pay $70 for damages done to his land.

Resolved unanimously, That the said contract be approved and confirmed.

Resolved unanimously, That the following persons be now appointed lock-keepers on the Western division. For lock No. 1, W. W. Gibson; for lock No. 5, John Spear; for lock No. 6, John Leggit; for lock No. 9 and 10, Richard Getty.

Resolved unanimously, That George King be appointed lock-keeper for lock No. 3, on the Kiskiminetas division.

Mr. Clarke having retired from the meeting a communication from him in relation to the employment of W. B. Mitchell, as his agent on the Juniata division, during his illness, and to the refusal of the accounting officers, to allow the wages paid to said Mitchell, was read, and on motion laid on the table.

Resolved unanimously, By the six members present, namely, Messrs. Sergeant, Lacock, Mowry, Philips, Roberts and Montgomery, That Thomas Enoch, esq. be appointed supervisor of the Western division.

Resolved, That the acting commissioner of the Susquehanna division, be authorised to pay John Cake $35, the amount estimated by the engineer, as the value of removing his building on section 44 of that division.

Mr. Clarke resumed his seat at the board, a communication from the Governor covering the copy of a proposition from the cashier of the bank of Pennsylvania, in relation to the instalment of this year's loan, having been read and considered, the following resolutions were offered and unanimously agreed to.

Resolved That his excellency the Governor, be requested to accept the proposition of the Bank of Pennsylvania, as contained in a letter from the cashier of the thirteenth instant, varying the instalments of the permanent loan, so that $293,094 00 may be received into the treasury immediately, and the further sum of $141,151 00 on the first of each succeeding month, to the first of February.

Resolved, that his excellency the Governor, be further requested, in case it shall appear by the amount of money required for canal purposes within the next 3 months, that the sum of $150,000 advanced out of the State treasury, cannot be repaid by the last day of November, without embarrassing the operations of the canal, to negociate further with the bank of Pennsylvania, for the anticipation of the instalment due on the first of February, so as to bring in that instalment by the last day of November, in payment of said advance.

Resolved, That the President of the board be authorised, in case it shall appear that the arrangements contemplated by the foregoing resolutions will not be sufficent, to give notice to the Governor, and request him so far to anticipate the January instalment, as to meet such deficiency.

Resolved, That the Board will meet for the purpose of reporting to the Legislature, on the 5th day of December next.

Resolved That the several acting commissioners, and superintendents, be instructed to inform the secretary by the first of November next, how much money has been expended from this time to that date, and also what further amount they will require within the next three months.

The following resolutions having been offered, were unanimously adopted.

Resolved, That the board will place under contract, the present season, the following additional lines of canal.

1. From Blairsville on the Conemaugh, to a point near Johnstown, as located by Mr. Harris.

2. The French creek feeder as far as Muddy run.

3. A further portion of the North Branch, so as to make the part already contracted for, 45 miles.

4th. On the West branch, from Sugar Camp island, to the forks at Northumberland.

5th. On the Juniata 45 miles beginning at Lewistown, and ending above Hunterdon.

6th. On the Delaware, from New Hope to a point near Godfrey Raub's tavern, as recommended by Mr. Sargeant.

7th. Ten miles of the line between the mouth of Swatara and Columbia, as located by Mr. Kneas.

Resolved, That the several engineers, be directed to prepare, and the acting commissioners and superintendents, to advertise the said lines for contracts, in the following order: 18 miles on the Delaware, and the remainder of the French creek feeder, as soon as practicable. The West branch line on the first of October, and the remaining lines not earlier than the 15th. of October, nor later than the first of December: *Resolved*, That in the contracts so made, except for the Conemaugh line, the French creek feeder, and the first 18 miles on the Delaware, it shall be stipulated that no payment be made for the work done in pursuance of such contracts, before the 18th day of January next.

Adjourned to meet in Harrisburg on the 5th day of December next.

Harrisburg, Dec. 5th, 1828.

The board met this day according to adjournment.

Present Daniel Montgomery Esq., President Messrs. Roberts, Scott, Mowry, Phillips, Clarke and Hammond.

Reports from Mr. Mowry, acting commissioner, and Messrs. Kennedy, Woodside, M'Reynolds and Mitchell superintendents, accompanied by documents, showing the situation of the several lines of canal under their care, were read.

A report from Moncure Robinson, engineer, upon the surveys of canal and rail-road lines under his direction, was read.

A report from John Wilson, engineer, upon the rail-road line from Columbia to Philadelphia was read, and on motion, it was referred to Messrs. Roberts, Hammond and Scott.

A petition from citizens of the borough of Marietta, asking a change in the location of the canal, as now fixed through that place, was read and laid on the table. Two communications from citizens of Bedford county, in regard to the locations of the Pennsylvania canal on the upper Juniata, were read and laid on the table.

Adjourned to to morrow at 9 A. M.

Harrisburg, Dec. 6th, 1828.

Present as yesterday,

A report from D. B. Douglass, engineer, upon the survey of a canal from Carpenter's point along the Delaware to Easton was read, and the following resolutions were unanimously adopted.

Resolved, That the board with the appropriation of David B. Douglass their engineer, if his Excellency the Governor shall consent thereto, do now fix the location of a line of canal along the

west side of the Delaware river, from Carpenter's point to Easton, according to the report and recommendations of the said engineer.

Resolved, That the Secretary be requested to prepare the sketch of a report to the Governor, and to present the same at the next meeting of the board.

Mr. Mowry, acting commissioner, presented for confirmation a contract with Frazer Montgomery, to pay $200 00 for damages, and in lieu of a Bridge; and with Robert Harris to pay $300 for damages.

Resolved unanimously, That the said contracts be approved and confirmed.

Mr. Phillips presented a petition from Henry Crowell, a contractor on the French Creek feeder, for relief; *Resolved unanimously*, That the prayer of the petition cannot be granted.

Mr. Wilson, superintendent, presented for confirmation, a contract with William Grimshaw to pay $193 00 for damages.

Resolved unanimously. That the said contract be confirmed on condition that the quantity of ground required for a lock house be considered as included in the release of Mr. Grimshaw.

Mr. Wilson also presented an agreement with John Fox, to pay $185 25 for damages. *Resolved unanimously*, That the said agreement be confirmed, and that Mr. Wilson be authorised to pay the amount, on the execution of a release by John Fox and wife, duly acknowledged.

Mr Wilson presented also an agreement with John Frantz to pay $250 for damages.

Resolved unanimously, That the said agreements be approved and confirmed.

Resolved, That a committee be appointed to consider what business will require attention at this session of the board, to report on Monday morning.

Messrs. Roberts, Mowry and Phillips, were appointed on that committee.

Adjourned to 9 o'clock, A. M. on Monday the 8th, inst.

Harrisburg, Dec. 8th. 1828

9 A. M.—The board met.

Present Daniel Montgomery Esq. President, Messrs Lacock, Scott, Mowry, Phillips, Clarke, Roberts and Hammond.

A petition from Christian Brobst and others, asking for the construction of a road opposite Catawissa, was read and referred to Messrs. Clarke and Roberts.

A communication from William A. Lloyd of Northumberland, in regard to the canal and basin at that place was referred to Messrs. Montgomery, Hammond and Mowry.

Mr. Phillips presented for confirmation, an agreement with William Magaw, to pay $191 81 damages, for the removal of a hay press on the French creek feeder.

Resolved, That the said agreement be approved and confirmed.

Releases by Lewis S. Corryell and T. G. Kennedy, of Bucks

county, of their right to fencing where the Delaware division passes through their land, in consideration of 75 cents a rod being paid to them, were read and unanimously approved.

The committee appointed to consider what business will require attention at the present session of the board, made report.

The following resolution was then offered and unanimously agreed to.

Resolved, That the superintendent of the West Branch division be authorised to contract for the construction of a turnpike and towing path bridge across the West Branch at Northumberland, and that he be further authorised when he shall deem it necessary, to contract for a tow-path, and the clearing of a channel for two miles above the dam at Sugar Camp island.

The following resolutions having been read, were unanimously adopted.

Resolved, That for the purpose of providing funds necessary to continue the canals now under contract, it be recommended that a permanent loan of $800,000 be negotiated as soon as practicable.

Resolved, That in order to meet the wants of the improvements before the said permanent loan can be arranged, it be further recommended that so much of the balance now in the treasury of the commonwealth as can conveniently be spared, be temporarily transferred to the treasury of the canal, and that the Governor be further authorised to obtain a temporary loan for such additional amounts as may be necessary. Such temporary advances to be repaid at the pleasure of the Governor at any time before the first day of June next.

Resolved, That Messrs. Roberts, Lacock and Clarke, be a committee to present to the Governor the foregoing resolutions and to confer with him thereupon.

A report from Nathan S. Roberts, engineer, upon the surveys made by him, with a view to determine the best line for a portage across the Allegheny mountain, was read.

The board being informed that Mr. Roberts had accepted employment upon the Potomac and Ohio canal, and therefore declined further service in this state, the following resolutions were offered and unanimously adopted.

Resolved, That Moncure Robinson, Esq. be appointed engineer for the portage line across the Allegheny mountain, this appointment to take effect, as soon as his duties with reference to surveys of the past season, shall have closed.

Resolved, That Mr. Robinson be furnished with the report, field notes, level books and drafts of Mr. Roberts, in relation to this portage, and that he be directed as early as the weather will permit, to proceed to the execution of the duty now assigned him.

Resolved, That the attention of Mr. Robinson be particularly directed to three points. 1. The construction of a railway between

the waters of Juniata and Conemaugh, overcoming the summit by means of stationary engines or self-acting planes with intermediate levels or moderately ascending planes. 2. The construction of a Mac-Adamized turnpike of the best kind between the same points. 3. The suggestion of any other plan which may occur to him, as calculated to afford the best accommodation to trade.

Resolved, That Mr. Robinson be directed as soon as he shall have made the necessary examinations, to furnish the board with his views and opinions in detail.

The secretary presented a partial sketch of a report to the legislature, which having been read, ordered, that the same be completed and read again to-morrow morning.

Adjourned to 3 o'clock, this afternoon.

Harrisburg, December 8, 1828.

3 P. M.—The board met.

Present, Mr. Montgomery, president, Messrs. Lacock, Phillips, Hammond, Roberts and Mowry.

A remonstrance from citizens of Harrisburg, against the change of the tow-path through the borough, was read and referred to Messrs. Lacock, Hammond and Phillips.

Mr. Roberts, from the committee appointed this morning, to present to the Governor, certain resolutions of the board in regard to funds, reported that they had performed the duty assigned them, and that they had received an assurance from the Governor that the subject should command his earliest attention.

Mr. Mitchell, superintendent of the French creek feeder, presented for confirmation, agreements for damages with John Gibson, Abraham Sewer and John Patterson.

Resolved unanimously, That the said agreements be approved and confirmed.

Adjourned to 9 o'clock, to morrow morning.

Harrisburg, December 9th, 1828.

The board met:

Present Mr. Montgomery, president, Messrs. Scott, Roberts, Phillips, Hammond, Lacock and Mowry.

A report from Edward F. Gay, engineer, on the surveys executed by him along the Allegheny, Monongahela and Ohio rivers, was read.

Mr. Roberts, from the committee appointed to consider the report of major Wilson, on the rail-way line from Columbia to Philadelphia, made the following report:

That after a consideration of the subject, in reference to the point of time designated for its completion, in the law which provides for the construction of the road and the vigorous prosecution of the other lines of improvement, none of which promise more public benefit than this, the committee believe that 20 ,000 dollars

may be conveniently applied to the construction of the road during the ensuing year. This sum will be sufficient to form the road for about one half the distance between the Susquehanna and the Delaware, and will afford an assurance that the road will be completed simultaneously with the lines of canal above, if not within the time prescribed by law.

The survey of the line as returned by the engineer, gives a strong assurance that it is the best the ground permits, and the point of contact with the city of Philadelphia is by the shortest line, and the upper and lower levels are connected by one inclined plane. It is not conceived that a termination of the road at one territorial point unconnected by a branch or branches reaching navigation, and the larger front the better can accommodate the road. The committee concur that a branch from the lower level at Belmont down to tide water opposite, will be absolutely necessary to accommodate the trade which may be expected to pass over the line. The committee do not wish to interfere with the confirmation of the line to Broad street, by a bridge over the Schuylkill, but they do not apprehend they can commit an error in estimating the branch down the Schuylkill, from Belmont, as entitled to the earliest attention. This termination however, would not meet the provisions of the law which requires a termination at the city of Philadelphia, and not at tide on its western front. They therefore submit the following resolutions:

Resolved, That the board with the approbation of John Wilson, their engineer, if his excellency the Governor shall consent thereto, do now locate the Pennsylvania rail-way, beginning at the termination of the eastern division of the Pennsylvania canal in the borough of Columbia, and extending thence according to the report and draft of the said engineer, through the northern part of the city of Lancaster, across the gap of Mine ridge to the station marked for an inclined plane near the residence of the late Judge Peters, on the Schuylkill river, thence by bridge across the Schuylkill, and by the line of the old Union canal to the corner of Broad and Callowhill streets in the district of Spring garden, and thence along the middle of Broad street until it crosses the line of the city of Philadelphia.

Resolved, That the board will advertise for contracts as soon as practicable, the road formation of twenty miles from the foot of the inclined plane on the Schuylkill, extending westward, and of twenty miles more extending eastward from Columbia.

Resolved, That it be earnestly recommended to the Legislature to authorise the board to construct a branch of the said rail-way, from the foot of the inclined plane near Judge Peters', down the west side of the Schuylkill to a convenient point on the sloop navigation of that river.

The question being taken on these resolutions separately, the first resolution was unanimously agreed to—On the second, the yeas were Messrs. Scott, Roberts, Phillips, Hammond, Mowry and Montgomery—6, Nay Mr. Lacock—1.

On the third resolution all the members present voted in the affirmative.

So the report and resolutions were adopted.

Mr. Clarke appeared, and reported to the board that in consequence of the resignation of Mr. Purcell, as principal assistant engineer on the Juniata division, he had, during the recess of the board, assigned his duty to Barent Schuyler, one of the sub-assistants on that division.

Resolved, That Barent Schuyler be appointed a principal assistant engineer, on the Juniata division, at a salary of $3 50 per day, to commence from the date of Mr. Purcell's resignation.

A report from Mr. Kennedy, superintendent of the Delaware division, stating the resignation of Emerson M'Ilvaine, the senior assistant engineer on that division, and stating what arrangements were proper to complete the engineer corps, was received, and it was

Resolved unanimously, That the salary of F. W. Mills, principal assistant engineer on the Delaware division, be fixed at $4 a day, from the date of the resignation of E. M'Ilvaine. That Charles Schlatter and James Sergent, be appointed principal assistants on the same division, at the rate of $3 a day, to commence from the date of the said resignation.

The following resolution, offered by Mr. Mowry, was unanimously agreed to.

Resolved, That the compensation of John A Byers, as a principal assistant engineer on the Susquehanna division, be fixed at $3 a day, from the date of the commencement of his services in that capacity, an error having been made in fixing it at $2 75 a day, at the meeting in June last.

Mr. Clarke, presented for confirmation, agreements with Andrew Vancamp, to pay $ 25, with Jacob Earhart, to pay $36; with Amos Farnum, to pay $ 40, with Amos Gustin, to pay $ 75, with John Cummins, to pay $300, and with Mary Shuman and others, to pay $ 150.

Resolved unanimously, That the said agreements be approved and confirmed.

Mr. Mowry presented for confirmation, agreements with Lyman Hodge, to pay $ 55, with James Dill, for digging a well on section 31, with Rebecca H. Dumir, for removing a fence $ 20 44, with J. App, for removing buildings and fence, $ 42 20, with Martin Weaver, for removing fence, $ 25.

Resolved unanimously, That the said agreements be approved and confirmed.

The committee appointed to consider the remonstrance of citizens of Harrisburg, against the change of the tow path, reported:

That they have considered the subject referred to them, and examined the ground in company with some of the petitioners, and

are unanimously of the opinion, that to grant the request of the petitioners and to establish the towing path permanently on the Harrisburg side of the canal, would subject the inhabitants to great and lasting inconvenience and embarrassment, in consequence of being cut off and deprived of every opportunity of erecting warehouses, or the means of trading or depositing the products of the upper country or merchandize necessarily connected with the convenience and commerce of the people, residing at the seat of government. They therefore offer the following resolution:

That it would be inexpedient to grant the prayer of the petitioners.

The said report and resolution having been read, were unanimously agreed to.

The committee to whom was referred the letter of William A. Lloyd, of Northumberland, made report:

That from inquiry of both the engineers, on the two branches of the Susquehanna, whose works unite at Northumberland, they find that the basin at the junction will be common to both canals; that it would be nothing more on either branch than a widening of the canal to about 100 feet, sufficient for a boat to turn in; that the nature of the ground is such, that the expense of a canal 100 feet wide, will cost little more than one 40 feet wide and that the basin on the north branch is to be of the same width as that on the west, and that from all they can learn it is their opinion that the location has been judicious, and requires no interference of the board. They therefore offer the following resolution.

Resolved, That the committee be discharged from any further consideration of the subject.

The same committee, to whom was also referred the subject of constructing an independent set of locks to each canal, to enter the pool in the West Branch of the Susquehanna, beg leave to report:

That they can see no good reason at the present time for a double set of locks at this point, inasmuch as all the trade that would pass through both sets, must pass one tow bridge and a single set of locks below, and below the Juniata junction with the Susquehanna canal, the whole western trade in addition to that of both branches of the Susquehanna, must pass through a single set of locks on the eastern division. And as the dispensing with one set of locks would relieve the state of a considerable item of expense, therefore

Resolved, That the outlet locks upon the North Branch canal at Northumberland, be dispensed with, and that the engineer upon said North Branch division, be directed to terminate his line at the junction with the West Branch division.

The said report and resolutions having been read, were unanimously agreed to.

Adjourned to 9 o'clock, to-morrow morning.

Harrisburg, December 10, 1828.

9 A. M.—The board met. Present all the members of the board except Mr Sregeant.

Mr Clarke, acting commissioner, laid before the board a report on the Juniata division, accompanied by documents.

The secretary presented a report to the Governor prepared according to the directions of the board. The same having been read and discussed,

Ordered, That the secretary be directed to have a fair copy made out and presented to the board, as early as practicable.

The following communication from Abner Lacock, acting commissioner on the westeren division, was read.

To the board of canal commissioners,

GENTLEMEN:

It will be recollected that at the last meeting of the board, application was made by Alonzo Livermore, engineer, D. K. Bishop, assistant, and W. P. Stuart, for the privilege of using the surplus water of the river at the dam erecting near Blairsville. This the board refused to grant, and the result was communicated to those concerned soon after my return. On a subsequent visit to Blairsville, I discovered a saw mill in course of erection, and a culvert constructed, over which it was necessary to throw a heavy guard bank to protect the dam and guard lock from the floods of the river. This was done without my knowledge, advice or consent. It is proper to observe, that the purchase of the land in question was made by the company some time after the dam had been located by the special direction of the board who met at that place. Another outlet has been made and a saw mill is nearly completed by Messrs. Leach and Trucks, at dam No. 1, on the Kiskeminetas.

There is much surplus water in this stream, that could be advantageously applied to hydraulic purposes. This water belongs to the public, but if thrown upon the lands of an individual, he has a right to its use, provided he throws it into its original channel upon his own ground, without injury to the public. But it appears to me that no step should have been taken to apply the water to private use, without the consent of the state, and an agreement as to an equivalent for its use. It is true that should the guard banks have been erected, and no device made for conveying the water through them to the works below, it would have been very expensive and perilous to have done it after the doors were filled with water. Thus situated and believing the erection of the culverts through the guard banks, indispensible to the public interest as connected with the future sale of water rights, I should not, had I possessed the power, have directed their demolition. If however the board should think it advisable to prevent the use of the water thus designed to be drawn off, they will direct the mouth of the culverts to be filled with embankment, and the object will be effected. Having stated all the facts that have come to my knowl-

edge, the subject is respectfully submitted to the board for their consideration and direction.

(Signed) A. LACOCK, A. C.

December 10, 1828.

On motion that the said communication be referred to a committee, Messrs. Scott, Hammond and Clarke, were named as such committee.

Resolved unanimously. That the acting commissioners be a committee to digest, and present to the board, a list of tolls on the finished portions of the canals; and also to consider and report what salaries it is expedient to allow to lock-keepers and collectors.

Resolved unanimously, That the various applications for appointment as collectors and lock-keepers. be referred to a committee.

Messrs. Clarke, Hammond and Mowry, were named as such committee.

Resolved unanimously, That the acting commissioners and superintendents on the lines of canal respectively, be authorised to lease or let from year to year, such lands, houses, and improvements as are the property of the commonwealth, lying adjacent to such canals.

Resolved unanimously, That the appointment of Theophilus Williams, as principal assistant engineer, under Nathan S. Roberts, on the 16th. June 1828, be now confirmed, and that he be allowed for his services at the rate of $3 00 per day from the above date.

A communication from the senators and representatives, from the county of Lancaster, in regard to the location of the eastern division through Marietta, was read; and was referred together with the petition on that subject, to a committee.

Adjourned to 3 o'clock, this afternoon.

Harrisburg, December 10, 1828.

3 P. M.—The board met.

Present as this morning except Messrs. Phillips and Roberts.

The committee to whom was referred the communication of Abner Lacock, acting commissioner of the western division, made report:

That they had the subject under consideration, and are of opinion that it is unnecessary at this time, to decide upon the rights of individuals owning or possessing sites fit to be occupied by hydraulic machinery. Your committee are clearly of opinion that all the surplus waters raised in the construction of canals and slack water navigation, belong exclusively to the commonwealth, and cannot be appropriated to the use of individuals or companies without her consent.

In relation to the hydraulic works mentioned in the statement of General Lacock, it appears that they were erected after the board had refused their assent, and after the decision of the board had

been communicated to Messrs. Livermore and Bishop, by General Lacock.

Your committee therefore, as well to protect the interests of the commonwealth as to rid the board of the odium of retaining in their service men whose conduct (whatever the motive) indicates a disregard to the reputation and opinion of the board, and the public interest, recommend the adoption of the following resolutions.

Resolved, That Alonzo Livermore an engineer, and D. K. Bishop an assistant engineer in the service of the board, be dismissed the service.

Resolved, That General Lacock, the acting commissioner, be authorised and required to stop or fill up the culverts constructed to draw water from the dam at Blairsville, and at dam No. 1 on the Kiskeminetas.

The said report and resolutions having been read, Mr. Mowry moved their postponement for the purpose of introducing the following preamble and resolutions.

Whereas it appears from a report of the acting commissioner on the Conemaugh division of the Pennsylvania canal, that Alonzo Livermore an engineer, and D. K. Bishop, an assistant engineer in the service of the state, together with William P. Lamett, made application to the board of canal commissioners, for the surplus water in the dam at Blairsville, for which they were willing to pay whatever the board or the state might think proper to ask; and whereas the board was unwilling and felt themselves unauthorised to grant such privilege or make such contract, but referred them to the legislature: And whereas these persons subsequently improved the only practicable opportunity of providing the means of taking such water at any future period, by constructing a culvert for the purpose, across the trunk of the canal, before the banks were made at that place, and have built a saw-mill which they contemplate to drive by the water from said dam, which is going to waste: And whereas it is apparent that they hold themselves to pay the state a just compensation therefor, whenever she shall name her terms: And whereas the improvement thus by them constructed, appears to be calculated for a public benefit, and injurious to no one: nevertheless, as the means of taking the water and the preparations for using it, were provided without authority, and the whole proceeding wrong in principle, Therefore,

Resolved, That the board decidedly disapprove of the conduct of Alonzo Livermore, an engineer, and D. K. Bishop, an assistant engineer, in the employment of the state, in availing themselves of the opportunity of taking water from the Blairsville dam, for hydraulic purposes, without authority to do so.

Resolved, That the acting commissioner upon the Conemaugh division, be directed to cause the passage through the said culvert, to be immediately stopped, so to remain, till otherwise ordered by authority of the legislature.

On the question of postponement, the yeas were Messrs. Lacock, Montgomery and Mowry, 3.—The nays Messrs. Clarke, Scott and Hammond, 3.—So the motion to postpone was lost.

The question then recurring on the first resolution, the yeas were Messrs. Clarke, Scott and Hammond 3—The nays Messrs. Lacock, Mowry and Montgomery, 3—So the resolution was not agreed to.

Mr. Phillips appeared at the board.

The following resolutions were then offered as substitutes for those reported by the committee:

Resolved, That the board highly disapprove of the conduct of Alonzo Livermore and D. K. Bishop, in relation to the dam at Blairsville, and but for a belief that it has proceeded from ignorance of their professional and official obligations, rather than from deliberate intention to violate the directions and policy of the board, would promptly discharge them from the service of the commonwealth,

Resolved, That any future interference with, or speculations in the public works, by any engineer or assistant engineer, will be promptly visited with the severest discipline.

Resolved, That in all such cases, the acting commissioner or superintendent, be empowered when the fact comes to his knowledge, to discharge such officer from the line.

Resolved, That a copy of the foregoing resolutions be furnished to the parties concerned.

The question being called for on the first resolution, Mr. Scott moved to strike out all after the word "Bishop," and insert the words "*and that they be dismissed from the public service.*"

On this motion the yeas were Messrs. Scott and Clarke, 2.—Nays Messrs. Lacock, Hammond, Montgomery, Philips and Mowry. So the motion was lost.

The question being then taken on the resolutions as offered, they were unanimously adopted.

A communication from Ner Middleswarth, esq. and other members of the legislature, in regard to a communication between the West Branch division and the river opposite Lewisburg, was read, and it was

Resolved, That the board will recommend the subject to the notice of the legislature.

Resolved unanimously, That when the board adjourn, they will adjourn to meet at this place on the 25th of March next, unless informed by notice from the president, that it is expedient to hold the meeting at an earlier or later period.

A report from Abner Lacock, acting commissioner upon the Western division, accompanied by documents, was read.

Adjourned to 9 o'clock, to-morrow morning.

Harrisburg, December 11, 1828.

9 A. M.—The board met.

Present. Mr. Montgomery, president, Messrs. Scott, Roberts, Lacock, Mowry, Clarke, Hammond and Philips.

The secretary laid before the board, a report prepared for transmission to the Governor. The same having been read and agreed to,

Resolved unanimously, That it be signed by the president and secretary, and sent with the several documents referred to therein, to his excellency the Governor.

The committee to whom was referred, the subject of tolls, collectors and lock tenders, made the following report:

That from the best consideration they have been able to bestow, they have been led to recommend the following, as the most proper rates of toll, to be charged upon the transportation of boats, produce, and other articles of carriage, upon the Pennsylvania canal, viz:

	cts.	m.
On flour, salted beef, pork and fish, butter, and cheese, beer and cider, per ton per mile,	1	5
On salt,	1	5
On gypsum,	1	5
On brick, sand, lime, stone unwrought or rough hewn, clay, earth, leached ashes, manure and iron ore, per ton per mile	0	5
On marble in blocks, unwrought or rough hewn,	1	0
On marble wrought and polished,	2	0
On castings blooms, and anchonies,	1	5
On bar, rolled or slit iron,	3	0
On household furniture,	1	5
On furs and peltry, (except deer, buffalo and moose skins)	3	0
On deer, buffalo and moose skins,	1	5
On cotton,	1	5
On pot and pearl ashes, charcoal, pig iron and broken castings,	1	0
On mineral coal,	0	8
On slate and tile for roofing,	1	0
On timber squared and round, if carried in boats or scows, per 100 cubic feet per mile,	1	0
The same if carried in rafts,	1	5
On hemp and tobacco, going eastward per ton per mile,	1	0
On staves and heading, if carried in boats per ton per mile,	0	5
The same if transported in rafts,	1	0
On boards, plank and scantling, reduced to inch measure, and all siding lath, and other sawed stuff, less than one inch thick, per M feet per mile if conveyed in boats or scows,	1	0
The same if transported in rafts per M feet per mile,	2	0
On shingles, if conveyed in boats, per. M per mile,	0	2
The same if in rafts,	0	4
On split posts and rails, for fencing,	4	0
The same if in rafts,	8	0
On Wood for fuel, per cord per mile if in boats	1	0

	cts.	m.
The same if in rafts, per cord per mile,	2	0
On tan bark per cord per mile, if in boats,	1	5
The same if on rafts per cord per mile.	2	0
On hoop poles and split lath per ton per mile,	0	5
On carts, wagons, sleighs, ploughs, and agricultural implements and mechanics' tools necessary for the owner's individual use, when accompanied by the owners emigrating, per ton per mile,	1	0
On all articles not enumerated, passing north or west, per ton per mile,	3	0
On all articles not enumerated, passing southward and eastward per ton per mile,	1	5
On all agricultural productions not particularly specified, per ton per mile,	1	5

Explanation. Cattle, horses and all other live stock, the raw hides of domestic animals, are to be considered as included within the term "agricultural productions," and each horse is to be estimated at 6 cwt.

On boats made and used chiefly for the transportation of property, per mile, 2 0

On boats used chiefly for the transportation of persons 20 cents per mile, or 6 cents per mile on the boat, and two mills per mile on each passenger over eight years of age, at the election of the proprietors: Provided, they render such satisfactory accounts of the number of passengers, as may be required, and make such election when their boats commence business for the season.

On each passenger transported in freight boats, and over 12 years of age, per mile, 0 2

For passing outlet locks at Middletown, except such craft as have come or are going immediately on the Pennsylvania canal.

On every loaded ark,	$ 1 00
Empty do	50
On every loaded boat,	75
Empty do	50

Lumber of all kinds, in rafts or platforms, at the rate per M feet board measure, of 08

The committee further recommend, that the receivers of tolls, shall be appointed during the pleasure of the board, at a salary of forty dollars a month, with a house for each to live in, rent free, in which his office shall be kept, or a sum of $ 200 a year in lieu thereof. That the said receivers shall be required to give bond with freehold security to the satisfaction of the treasurer of the canal board, in the sum of $ 10,000 each, for the faithful discharge of all the duties of their offices, and strictly account for all moneys which they may receive as tolls. That each receiver shall be required to deposite his collections weekly, in such bank as shall be directed by the state treasurer, if within the distance of ten miles, and monthly, if at a greater distance, and settle his accounts quarterly, with the auditor general or such agent as he may appoint for

the purpose, default of which in any case, shall be considered sufficient cause for removal.

That supervisors, of the finished portions of canal shall receive at the rate $2 50 a day, for the time they may be necessarily and actually employed in discharging the duties of their office.

They also recommend, that lock tenders shall receive for tending a single lock, a salary of ten dollars a month each, and for two or more locks, where combined or so adjacent to each other, as to render it practicable for one man to tend both or all of them $12 50 a month, with a house to live in, rent free.

Resolved, That the foregoing rates of toll, and of compensation to collectors, supervisors and lock tenders be adopted, till otherwise ordered.

The foregoing report and resolutions having been severally read and considered, it appeared that they were unanimously adopted.

The committee to whom was referred the petition from Marietta, &c. made report.

That from inquiries made of the locating engineer, Mr Kneass, and explanations given by him, and from the fact that Mr. Wilson, on a former occasion, located upon the same ground and upon the same plan, they are led to believe that it is the most judicious that could be made. It appears that throwing the level lower down opposite the town would occasion more expense of embankment, and more difficulty in constructing bridges, and that taking Chickey's creek into the canal would occasion a dam and guard lock which would be more expensive than an aqueduct, and must render the navigation more unpleasant if not more unsafe.

Judge Rawle, a third engineer has also been on this ground, and approved of the location. The committee are aware that if errors are committed in locating a canal, the proper time to correct them, is before the work is commenced; but when three different engineers agree in a location, none of whom having any interest to bias them improperly, there ought to be much stronger grounds for distrust, than appear to exist in this case, to warrant a special view of the board, at a distance of 20 miles from its sittings. And inasmuch as it appears that the location through Marietta, is not yet put under contract, and probably nothing will be done at the aqueduct, before the next meeting of the board, therefore *Resolved*, That this subject be postponed until the board meet again. The report having been read was unanimously adopted.

Mr. Clarke from the committee to whom was referred the several applications for appointment as lock-keepers, collectors, &c. made report. That having examined the subject together with the recommendations of the several applicants, they are of opinion that it is not necessary at present to make any further apportionment of supervisors. But that in addition to the collectors and lock-keepers heretofore appointed, the following persons who have been recommended, should be appointed, viz.:

Thomas C. Reed of Gettysburg Adams county to be collector at Middletown.

Thomas Johnston of Blairsville, to be collector at that place.

Jonas Shartil to be lock-keeper at Updegroves on the eastern division.

On the question shall this report be agreed to, and the appointments therein named be made, the yeas were Messrs. Scott, Hammond, Mowry, Roberts, Clarke and Montgomery 6. Nay Mr. Phillips, 1. So the appointments were made.

Resolved unanimously, That the acting commissioner of the western division, and the superintendent of the eastern division, be authorised to make such temporary appointments of lock-keepers as may be necessary before the next session of the board.

Resolved unanimously, That the secretary be directed to advertise for contract the road formation of twenty miles at each end of the Pennsylvania railway, as soon as it can conveniently be done.

Resolved unanimously, That William Wilson, Esq. be directed to take charge of the Pennsylvania railway as superintendent until some appointment to that office shall be made by the board; and that he be authorised from monies in his hands as superintendent of the eastern division to pay the expenses incurred in laying-out, and the sum necessary for carrying on the work.

An account of John Wilson, engineer, showing the monies expended by him in the survey and location of the Pennsylvania railway during the present season, amounting to $6041 49 was laid before the board.

The said account having been examined, *Resolved unanimously*, That it be allowed and confirmed.

Resolved unanimously, That it was, and is hereby declared to have been the intention of the board when fixing the salaries of principal engineers on the 5th of June last, that such salaries should commence from the date of the passage of the act of 10th April, 1828; or from the date subsequent thereto, when such engineers commenced their service.

Mr. Wilson presented for confirmation an agreement with Mr. Hoyer for damages. On the question of confirming the yeas were Messrs. Roberts, Hammond, Phillips, Mowry and Montgomery—6. Nays Messrs. Clarke and Scott—2.

So the agreement was confirmed.

The following preamble and resolution having been offered by Mr. Mowry, were unanimously agreed to.

Whereas on an application of Anderson, M'Namee and Co. for a re-measurement of the work done on section five of the eastern division, the acting commissioner was directed to procure a re-measurement. And whereas the acting commissioner reported at the next meeting of the board, that on a remeasurement, in conformity with said resolution, the engineer found an error had been committed prejudicial to the contractors to the amount of $230 60, Therefore.

Resolved, That the superintendent of the eastern division, be directed to pay said amount to the said Anderson, M'Namee and Co.

Resolved unanimously, That the acting commissioner of the western division, be authorised to construct the locks on the line

of canal from Blairsville to Johnstown, either of wood or stone as he shall deem most advisable.

Resolved unanimously, That Henry Minshall be appointed lock-keeper, for the locks at Harrisburg.

The following resolution having been offered by Mr. Mowry:

Resolved That William Wilson, superintendent be authorised to contract with, and pay the heirs of Judge Bucher, deceased, $150, as full compensation for all damage done the property of the said heirs on the eastern division. The yeas were Messrs. Scott, Hammond, Mowry, Montgomery—4. Nays Messrs. Phillips and Clarke—2.

So the resolution was agreed to.

Mr. Lacock presented for confirmation an agreement with Robert Perks, to pay for damages caused by overflowing his land, $350, and with George Hank for damages $110.

Resolved unanimously, That the said agreements be approved and confirmed.

Adjourned to 7 o'clock, to-morrow morning.

Harrisburg, December 12, 1828.

7 P. M.—The board met.

Present, Messrs. Scott, Lacock, Clarke, Phillips and Mowry.

Mr. Lacock presented for confirmation the account of N. S. Roberts, an engineer on the portage surveys, which having been examined,

Resolved unanimously, That the said accounts be approved and confirmed.

Mr. Philips exhibited an account of his expenses as a member of the board, which was approved and directed to be paid.

Adjourned to meet at Harrisburg on the 25th March next, at 4 o'clock P. M.

Liverpool

Michael Byrne

Liverpool